CHILDHOOD SHYNESS: A RISK FACTOR FOR THE DEVELOPMENT OF WEIGHT CONCERNS AND EATING DISORDERS?

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CONTENTS

PART 2

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Abstract

The present study assessed weight concerns in 177 New Zealand children aged between 11 and 13, and the relationship between weight concerns and shyness, with the aim of investigating whether childhood social anxiety may be a risk factor for the development of eating disorders. Concerns about weight were assessed using Killen et al.'s (1994) Weight Concerns Scale. Shyness was conceptualised according to Buss' (1986) theory of self-conscious and fearful shy subtypes, and assessed using the Early Adolescent Temperament Questionnaire's (Capaldi & Rothbart, 1992) shyness-, fearfulness-, and autonomic reactivity subscales, and the Imaginary Audience Scale (Elkind & Bowen, 1979). As many as 1 in 4 girls expressed a degree of weight concerns that might put them at risk of developing disordered eating according to Killen et al.'s (1994) cut-off score on the Weight concerns scale, whereas concerns about weight were much less common in boys. No significant relationship between shyness and weight concerns was found for either gender. Self-consciousness, fearfulness, and autonomic reactivity appeared to become more positively related to weight concerns with increased age for girls. Due to the lack of support for a relationship between weight concerns and childhood shyness as expressed in behavioural inhibition, it is suggested that the nature of the social anxiety possibly related to weight concerns and eating disorders might be better captured by theories of shyness and social anxiety that do not involve behavioural inhibition. Future studies might benefit from including measures of fear of negative evaluation as well as a wide range of cognitive, affective, behavioural, and physiological measures of social anxiety. Given the complexity of the changing relationship between weight concerns and psychological factors across development, it is argued that exploratory research using qualitative methods could provide a better understanding of children's concerns about their weight and how it may relate to aspects of social anxiety.

I.I EATING DISORDERS

Introduction

Eating disorders represent an area of increasing clinical concern. The tragedy of the young women who become obsessed with their weight and body shape and restrict their food intake until they reach critical levels of starvation, is obvious and disturbing. More hidden are the struggles of women who secretly engage in self-destructive patterns of fasting, binge eating and vomiting, while food and weight take on an all encompassing importance in their lives. What drives this obsession with body weight and shape? Many have attempted to understand how eating disorders arise and how they can be treated, and specialist therapy centres that deal only with eating disorders have now become a notable presence in the Western world. Despite these efforts, the etiology of eating disorders is not yet understood. At the same time there are disturbing signs that the prevalence of Anorexia Nervosa and Bulimia Nervosa among young women is increasing (Bushnell, Wells, Hornblow, Oakley-Browne & Joyce, 1990; Hoek, 1993; Kendler et al., 1991).

Research on weight concerns in the general population has uncovered that to a certain extent, other females share the concerns about weight. Weight concerns, dieting, and symptoms of eating disorders are widespread among female adolescents and young women, and some have suggested that eating disorders may simply be the extreme end of a continuum of dieting behaviours and weight concerns (French , Story, Downes, Resnick & Blum, 1995; Shisslak, Crago & Estes, 1995; Wardle & Marsland, 1990). Hill, Oliver, and Rogers (1992) have suggested that dieting is becoming more common amongst younger children, with girls as young as 9 years old reporting a wide range of dieting behaviours. Dieting is not restricted to children who are overweight, but occurs in those with average or below average weight as well (Hill et al., 1992). Severe dietary restriction in children and adolescents can have serious consequences in the form of growth retardation and delayed puberty, osteoporosis, and increased psychological distress (Kreipe & Forbes, 1990; Pugliese, Lifshitz, Grad, Fort & Marks-Katz, 1983; Rosen, Tacy & Howell, 1990), and is also an established risk factor for eating disorders (Patton, Johnson-Sabine, Wood, Mann & Wakeling, 1990; Striegel-Moore, Silberstein & Rodin, 1986).

As the extent of the problem has become apparent, several groups of investigators have called for early intervention to prevent the acquisition of subclinical and clinical eating disorders and to promote healthy weight regulation practises among children and adolescents (Killen et al., 1994; Striegel-Moore et al., 1986). A recent review of prevention research by the National Institute of Mental Health [NIMH] (1995) in the United States pointed to the importance of identifying risk and protective factors in order to be able to design effective programs for the prevention of mental disorders. They also pointed to the importance of understanding the mechanisms whereby risk and protective factors affect the development of a mental disorder.

Is it possible to identify a set of characteristics of individuals and their environments that influence the chance of developing an eating disorder? If we understood the factors that increase risk, then we might be able to reduce these risk factors, or diminish their effect on the development of eating related problems. Also, if we from knowledge of risk and protective factors were able to predict who specifically would be most at risk, then we could target intervention efforts at these individuals.

A growing body of literature has attempted to elucidate factors that make some individuals more susceptible to eating disorders. However, more research on risk factors and how these factors influence the development of eating disorders is needed in order for psychologists to be able to design interventions that target risk factors both at a socio-cultural, familial, and intrapsychic level. This study aims to contribute to our understanding of psychological risk factors for the development of eating disorders. More specifically, the focus is on social anxiety as a potential risk factor.

Recent literature has pointed to the possible role of anxiety as a risk factor for eating disorders (Bulik, 1995; Schwalberg, Barlow, Alger & Howard, 1992). Social phobia, a disorder characterised by marked and persistent fear of social or performance situations, is a common comorbid condition in Anorexia Nervosa and Bulimia Nervosa, and retrospective reports suggest that many experience social anxiety prior to the development of the eating disorder (Bulik, Sullivan, Carter & Joyce, 1995; Deep, Nagy, Weltzin, Rao & Kaye, 1995; Schwalberg et al., 1992). These findings have lead researchers to speculate on possible

etiological mechanisms for a relationship between social anxiety and eating disorders. However, there are difficulties in trying to base etiological models on risk factors identified from studies with women who have already developed an eating disorder. The social anxiety experienced by women with eating disorders could be a consequence of the disorder, rather than a causal factor, and retrospective reports may be biased by the women's current mental status (Bulik, 1995). At present, no studies have provided a premorbid measure of social anxiety in women who later develop an eating disorder (Bulik, 1995).

Bulik (1995) has argued that childhood social anxiety may be a risk factor for the development of concerns about weight and appearance. The relationship between social anxiety and weight concerns in children has received little attention in the research literature. The present study aimed to test Bulik's (1995) suggestion of a relationship between childhood shyness and weight concerns. If social anxiety is in fact instrumental in increasing weight concerns, then assessing social anxiety could possibly improve our prediction of risk. Since eating disorders develop in adolescence and young adulthood it is important to target prevention efforts at young adolescents or even children. Intervention must occur at a time in development when risk factors become manifest, but not after these risk factors have affected psychopathology to the extent where the disorder has developed (NIMH, 1995). A sample of 11-13 year old children were chosen for this study as these children were approaching the high risk age for eating disorders, while the prevalence of fully developed eating disorders was expected to be low.

A final purpose of the study was to examine weight concerns in New Zealand children at the Intermediate school level. A growing body of research has investigated body image and dieting in children in the United States and European countries, but to date comparatively little is known about weight concerns and dieting in New Zealand children. Killen et al. (1993) have emphasised the need to target prevention efforts at children who are excessively concerned about their weight. Knowledge of the extent of weight concerns in New Zealand children, the proportion of students who can be considered at risk of developing an eating disorder due to their weight concerns, and the demographic distribution of risk is important in order to be able to plan targeted interventions with these children.

The literature review that follows will first introduce readers to the clinical syndromes of bulimia nervosa and anorexia nervosa, and to some characteristics of women with eating disorders and their environments that are believed to be risk factors for the development of eating disorders. Next some of the theories surrounding the relationship between social anxiety and eating disorders will be reviewed. The main body of the review will focus on evaluating Bulik's (1995) suggestion that childhood social anxiety may constitute a risk factor for the development of eating disorders. Attention will be drawn to literature that assesses the prevalence and type of social anxieties in women with eating disorders, as well as studies that are of relevance in evaluating the proposed mechanisms through which social anxiety may affect the development of eating disorders.

Diagnostic and clinical features

Anorexia Nervosa

References to Anorexia Nervosa (from now on referred to as AN) in the English speaking world can be traced back to medical writings of the seventeenth century, and the disorder was described in detail by several physicians 100 years ago. The most obvious sign of AN is emaciation. The term "anorexia nervosa" is unfortunate in that it implies that the weight loss is due to a nervous loss of appetite. In contrast, individuals with AN often show an excessive interest in the food that they deny themselves and may spend a lot of time collecting recipes and cooking for others. Weight loss is usually accomplished primarily through restricting food intake, but additional measures such as purging (for example through self-induced vomiting or use of laxatives or diuretics) or excessive exercise are also commonly applied, particularly if the individual with AN has succumbed to the desire to eat unrestricted (Crisp, 1980). People may refuse to eat and lose weight for various reasons, and historically fasting has often been involved in purification rituals, but the clinical syndrome of AN as we know it today per definition involves refusal to eat because of concerns about body weight and shape. This strict definition of AN is of a relatively new origin, and research on AN prior to the 1980s sometimes refers to a variety of problems that would now be classified under other diagnostic categories. Most current studies use the criteria for AN found in the Diagnostic and Statistical Manual of Mental Disorders (DSM; American Psychiatric Association, 1994) in its various revisions. The diagnostic criteria used by DSM-IV are presented below.

A. Refusal to maintain body weight at or above a minimally normal weight for age and height (e.g., weight loss leading to maintenance of body weight less than 85% of that expected; or failure to make expected weight gain during growth, leading to body weight less than 85% of that expected).

B. Intense fear of gaining weight or becoming fat, even though underweight.

C. Disturbance in the way in which one's body weight or shape is experienced, undue influence of body weight or shape on self-evaluation, or denial of the seriousness of the current low body weight.

D. In postmenarcheal females, amenorrhoea, i.e., the absence of at least three consecutive menstrual cycles. (A women is considered to have amenorrhoea is her periods occur only following hormone, e.g., estrogen, administration.)

(p. 544 - 545)

DSM-IV recognises two subtypes of AN. A binge-eating/purging subtype is specified if the person engages in regular binge-eating or purging behaviour, and a restricting subtype is specified if these behaviours are absent and the person loses weight only through fasting or exercising (APA, 1994).

AN is less common than Bulimia Nervosa. Lifetime prevalence for women in the Christchurch Psychiatric Epidemiology Study was 0.3% (Wells, Bushnell, Hornblow, Joyce & Oakley-Browne, 1989). This is comparable to the 0.5% estimated lifetime prevalence among adult women in the United States (Patton, 1992). The prevalence among adolescent females is similarly estimated at approximately 0.2 - 0.5% (Bushnell et al., 1990; Childress, Brewerton, Hodges, & Jarrell, 1993; Kendler et al., 1991; Whitaker, 1992). The incidence rate of Anorexia Nervosa in females 15 to 24-years-old appears to have increased during the past 50 years (Hoek, 1993). AN is much more common in females than in males. The ratio of males to females in clinical samples lies between 1:10 and 1:20 (Hoek, 1993).

The onset of AN is usually during adolescence, and the mean age of onset is 17 years. The disorder often starts following a somewhat stressful life event, such as leaving home for college (APA, 1994). Initially the weight concerns and dieting may be no different from ordinary dieting, but then the pursuit of thinness becomes progressively more intense until the person with AN becomes terrified of gaining weight, and starts rigid regimes of control over food intake (Crisp, 1980). The long term course is variable. Whereas some recover after a single episode (APA, 1994), AN in clinical samples is often a chronic condition, and rates of complete recovery are low (Halmi et al., 1991).

Bulimia Nervosa

Bulimia nervosa (from now on referred to as BN) was first recognised as a separate syndrome during the 1970's (Vandereycken, 1994). Since BN is found in women of normal weight it is a less visible problem than AN. Individuals with BN share the excessive weight concerns found in AN. The hallmarks of BN is episodes of excessive food intake that are followed by attempts to rid the body of the food, or attempts to compensate for the eating binge through dietary restraint and exercise. Food eaten during a binge eating episode is usually rapidly consumed to a stage of painful fullness. The diagnostic criteria for BN outlined in DSM-IV are presented below.

A. Recurrent episodes of binge eating. An episode of binge eating is characterised by both of the following:

   1) eating in a discrete period of time (e.g., within any 2-hour period), an amount of food that is definitely larger than most people would eat during a similar period of time and under similar circumstances

   2) a sense of lack of control over eating during the episode (e.g., a feeling that one cannot stop eating or control what or how much one is eating)

B. Recurrent inappropriate compensatory behaviour in order to prevent weight gain, such as self-induced vomiting; misuse of laxatives, diuretics, enemas, or other medications; fasting or excessive exercise.

C. The binge eating and inappropriate compensatory behaviours both occur, on average, at least twice a week for 3 months.

D. Self-evaluation is unduly influenced by body shape and weight.

E. The disturbance does not occur exclusively during episodes of Anorexia Nervosa.

(APA,1994, p.549)

DSM-IV specifies a purging and nonpurging subtype of BN marked by the presence or absence of regular use of self-induced vomiting or the misuse of laxatives, diuretics, or enemas (APA,1994).

The Christchurch epidemiological study interviewed 1498 adults aged 18-64 and found a 1% lifetime prevalence of bulimia using DSM III criteria (Bushnell et al., 1990). In women aged 18-44, lifetime prevalence was 2.6% as assessed by trained lay interviewers. On the basis of clinician interviews of a subset of this sample, the estimated lifetime prevalence for this group was 1.7%. A strong cohort effect was found, with a higher lifetime prevalence among younger women, suggesting a growing incidence of the disorder among young women in recent years. The rate of BN found in New Zealand is comparable to that found in the United States. Kendler et al. (1991) found a lifetime prevalence of 2.8% for BN. Later birth cohorts had higher risk of BN and reported an earlier age of onset, confirming that the incidence of BN seems to be growing. Similarly to AN, BN is much less common in males than in females. The ratio of males to females in clinical samples lies between 1:10 and 1:20 (Hoek, 1993).

Several recent large-scale studies among female adolescents have resulted in prevalence estimates ranging from 0.0-5.8% for BN, and from 1.78 to 13.3% for the partial syndrome which is marked by the same features, but is less severe that BN (Childress et al., 1993; Dacey, Nelson, & Aikman, 1990; Whitaker, 1992). These studies are improvements on earlier studies which relied heavily on self-report questionnaires only, and include interviews with high scorers to eliminate "false positives". There are very few studies examining the prevalence of eating disorders according to DSM criteria in age groups younger than age 13, and studies using structured interviews with this age group are even less common. One study of 839 girls aged 11-12 used a structured clinical interview and found a prevalence of BN of 0.1% using DSM-III-R criteria (Killen et al., 1994). Four percent of the children displayed subclinical symptoms of bulimia nervosa. BN is believed to be very rare among children under 14 years of age (Lask & Bryant-Waugh, 1992).

Age of onset of BN is most commonly between 14 to 25 years of age (Bushnell et al., 1990), and the binge-eating frequently begins during or after an episode of dieting (APA, 1994). Although little is known about the course of the disorder in non-clinical samples, in clinical samples the disturbed eating pattern usually persists for many years with a chronic or intermittent course (APA, 1994; Fairburn et al., 1995).

Risk factors

Women with eating disorders are a heterogeneous group and vary greatly with regards to their eating behaviour and body weight, and the nature and extent of associated psychopathology. Striegel-Moore et al. (1986) have stressed the importance of this heterogeneity for identifying risk factors. A particular risk factor that may be central to the development of the disorder in one women may be minor in the development of another. A number of factors are also likely to come together to put any one person at risk.

Despite the diversity of women with eating disorders, correlational studies have found a number of personal and environmental characteristics that are more prevalent among women with BN or AN than among women in non-psychiatric control groups, and these differences have been interpreted as constituting possible risk factors. The particular focus of this review is the possible role of social anxiety as a risk factor. However, this potential risk factor can only be one among many others, and is likely to exert its influence in combination with other factors. A broad range of risk factors will therefore receive a brief review before attention is turned to social anxiety.

With regards to environmental factors, socio-cultural beliefs about the ideal body shape have been emphasised as contributing to the prevalence of eating disorders in a society. Attractiveness, and a thin body shape have become important values for Western countries, and obesity is a highly stigmatised condition (Striegel-Moore et al., 1986). These social norms are applied more strongly to women than men (Rodin, Silberstein, & Striegel-Moore, 1985). Research has found that being a female and living in an industrialised country increases the risk of developing an eating disorder (Hoek, 1993). Exposure to certain subcultures may further increase the risk. Women who are in professions with a high demand for thinness, such as dancers, models and actresses, and women involved in sports that emphasise a thin body have been found to be at increased risk of developing an eating disorder (Garner, Garfinkel, Rockert & Olmsted, 1987; Hamilton, Brooks-Gunn & Warren, 1985; Johnson-Sabine, Wood, Patton, Mann & Wakeling, 1985). The family environment is also believed to influence the risk of developing eating disorders. A history of childhood sexual abuse is reported more frequently among women with AN and BN than in the general population (Bulik, Sullivan & Rorty, 1989; Connors & Morse, 1993; Sloan & Leichner, 1986). There are some differences

between the families of women with BN versus AN, for example, women with BN perceive their families as more hostile, conflictual, and isolative than do women with AN (Humphrey, 1986).

A number of individual characteristics are more common in women with eating disorders than in the general population. Women with BN and AN are dissatisfied with their body size and shape, and minor fluctuations in weight have great temporary effects on their psychological wellbeing (Gross & Rosen, 1988; Halmi, 1987). It is reasonable to think that the degree to which women naturally meet the ideals of thinness will affect the risk of becoming concerned about weight. Women with eating disorders often report a history of premorbid obesity or above average weight (Crisp, 1980; Garner, Garfinkel & O'Shaughnessy, 1985; Russell, 1979). Most women report that the disorder followed a conscious attempt to lose weight through dieting (APA, 1994; Mitchell, Hatsukami, Pyle & Eckert, 1986). Women with AN or BN are often perfectionistic and set high standards, feel insecure and inferior, worry about being liked, and are self-critical, anxious, obsessional and ruminative (Bulik, Beidel, Duchmann, Weltzin & Kaye, 1992; Humphrey, 1986; Katz, 1985; Mizes, 1988). Some differences have been noted when comparing females with BN to those with AN. Women with BN have been described as more impulsive, more extroverted and more active interpersonally and sexually than women with AN Restricting type (Johnson, 1982). Women with AN Binge-eating/purging type are similar to women with BN on these characteristics. Women with AN show more social conformity compared to women with BN (Katz, 1985), and they appear to show more introversion (Stonehill & Crisp, 1977). Thus there may be risk factors that make it more likely that someone will develop one rather than the other type of eating disorder.

Other psychopathology has also been associated with eating disorders. Anxiety disorders and mood disorders commonly co-occur with both AN and BN (Brewerton et al. 1995; Bulik, 1995; Carter & Duncan, 1984; Weiss & Ebert, 1983; Kendler et al., 1991). High levels of alcohol and substance dependence have also been reported (Bulik, 1994). Both anxiety disorders and other psychopathology may be less common in AN Restricting type than in women who binge-eat and purge (Laessle, Wittchen, Fichter & Pirke, 1989).

Although several risk factors have been identified, their mechanisms of action are not well understood. Most etiological theories acknowledge the role of socio-cultural factors such as a slim ideal body shape, and the social stigma associated with being overweight, as important in the genesis of eating disorders. These cultural ideals result in a high prevalence of body dissatisfaction and dieting, particularly for females (Brownell, 1991). Restricted eating is associated with food preoccupations and disturbed eating patterns such as the oscillation between binge-eating and dieting (Polivy, Herman, Olmsted & Jazwinsky, 1984). Such disturbed eating patterns are often seen as existing on a continuum with eating disorders that individuals may move up and down on. However, because not all women go on to develop eating disorders, some have proposed that individual psychopathology is necessary in moving women from a normative discontent with their body weight and shape to clinically recognisable eating disorders (Garner, Olmsted, Polivy & Garfinkel, 1984). Brooks-Gunn, Attie, Burrow, Rosso, and Warren (1989) have suggested that the association between eating concerns and psychological variables may vary according to the salience of demand for thinness in the environment of the adolescent girl. Disordered eating may not be indicative of psychopathology in an environment that demands thinness, such as the environment surrounding dancers, where disordered eating may result from the need to keep the weight down. However, disturbed eating attitudes and behaviours in less extreme contexts may be more dependent on the presence of emotional problems.

I.II SOCIAL ANXIETY AND EATING DISORDERS

Theoretical developments

A number of authors have argued that social anxiety plays a role in eating disorders. Crisp (1982) has characterised AN as a phobic avoidance stance. The person with AN fears the weight gain associated with puberty and the social consequences associated with maturation. She feels ill equipped to take on the role of a maturing woman, and regresses back to a prepubertal state through her weight loss. Others start to treat her more like a child, and while she is emaciated, she is thus protected from what Stonehill and Crisp (1977) calls the "social panic" that has stemmed from growing emotional conflict involving the person with AN and the family. When weight is restored, and pubertal processes rekindled, the person with AN starts to experience high levels of social anxiety (Pillay & Crisp, 1977). According to Pillay and Crisp (1977), the adolescent with AN feels socially inept at the same time as she desperately wants to be socially acceptable. She feels timid, is highly sensitive to hostility and criticism, and shows a tendency to withdraw from social interaction. Pillay and Crisp (1977) stated that the shyness and withdrawn behaviour shown by females with AN is probably a defensive style designed to avoid potential criticism. At the same time she fears isolation, and the social avoidance thus creates a continuous dilemma. Social anxiety is seen as a result of the dilemma of wanting social contact yet fearing its consequences.

Boskind-Lodahl (1976) has also noted a sensitivity to criticism in women with BN. She described these women as fearful of rejection. According to Boskind-Lodahl, women with BN believe that in order to avoid rejection from males, they must always strive to be perfect, successful, happy, charming, feminine, beautiful, and thin. Failures in achieving this goal results in severe episodes of binging and purging. Segal and Figley (1985) agreed with Boskind-Lodahl' s claim that BN is associated with fears of rejection. But they also discussed the contrast in the literature between descriptions of women with BN as fearful of negative evaluation and shy, and other descriptions of these women as socially and sexually active. Their theory is that women with BN suffer from private shyness as described by Pilkonis (1977). Pilkonis (1977) have proposed that a group of shy people do not exhibit the usual social inhibition associated with shyness, and act outgoing, even though they experience social anxiety and fears of rejection. Pilkonis called this type of shyness "private shyness". Whereas

those who are publicly shy worry about their awkward behaviour and their failure to respond appropriately in social situations, the privately shy are concerned with their internal feelings of discomfort and their fear of negative evaluation. The privately shy know what must be done to please others, to be accepted, and to get ahead, and the anxiety they experience during social interactions is not obvious to others (Zimbardo, 1977). They often don't disclose their anxiety, and avoid detection through use of well learnt social skills, or by drowning their anxiety with alcohol or avoiding the situation altogether (Zimbardo, 1977). According to Segal and Figley (1985), women with BN, as do those who are privately shy, perceive a discrepancy between their own self-image and the way they want others to see them, and this creates a chronic fear of rejection. They may attempt to dampen these fears through striving to please others. When the incongruency between the way these women view themselves and the way they desire others to view them becomes too threatening, the women react with dissociative behaviour, including binging and purging, which reduces their stress.

Some researchers have argued that fear of rejection and need for approval in women with eating disorders arise from insecure attachment in childhood (Guidano and Liotti, 1983; Heesacker and Neimeyer, 1990). The insecure attachment is thought to create doubts about the self as lovable, and a desperate longing for closeness which is combined with shyness and fears of loneliness and abandonment (Heesacker & Neimeyer, 1990). Insecure attachment is also believed to result in increased fearfulness in general. Binge eating is perceived as a means of self-soothing when threatened in a world where others are expected to be unavailable or insensitive when called on for support (Armstrong & Roth, 1989).

Bulik (1995) has suggested that social anxiety in childhood may be a risk factor for the development of eating disorders. Referring to Buss' (1980) theory of two types of shyness, a fearful and a self-conscious shy subtype, Bulik (1995) speculated that self-conscious shyness might be the one most relevant in the etiology of eating disorders. The present study aimed to test Bulik's suggestion, and her hypothesis will therefore be described in some detail.
According to Buss (1986), the trait of fearful shyness most commonly develops during the first few years of life and results from a temperamental disposition to react with fearfulness and high autonomic reactivity to strangers and intrusive social interactions. This early developing shyness is similar to the phenomenon of behavioural inhibition investigated by

Kagan and his colleagues (Kagan, Reznick, & Snidman, 1987). Fearful shyness may also arise from classical conditioning of fear through experiences of being the target of aggression from others. Fearful shyness is characterised by heightened physiological arousal, behavioural inhibition and later cognitive concern about negative evaluation (Buss,1986).

In contrast, the trait self-conscious shyness does not involve fearfulness, but is characterised by excessive concerns with other people's evaluation of the public self (Buss, 1986). Self-conscious shyness develops later than fearful shyness and after the formation of a self-concept, which according to Buss emerges in the fourth or fifth year of life. The self-conscious shy are high on the trait of public self-consciousness, that is they are very aware of themselves as a social object. They often feel conspicuous and vulnerable. The primary stimuli that elicits self-conscious shyness are situations in which the person becomes subject to public scrutiny. The reason for this concern is that these situations have become associated with criticism about their social mistakes. The self-conscious shy experience cognitive distress over potential negative evaluation, but little physiological arousal. Fumbling, disorganised behaviour, and behavioural inhibition will occur, but is less severe than that shown by the fearful shy. Excessive training in childhood in the importance of other's opinions of your behaviour and appearance may predispose a person to self-conscious shyness (Buss, 1986). According to Cheek and Melchior (1990), self-conscious shyness peaks between age 14 and 17, as adolescents cope with cognitive egocentrism (the "imaginary audience" phenomenon; Elkind & Bowen, 1979) and identity issues (Adams, Abraham & Markstom, 1987; Cheek, Carpentieri, Smith, Rierdan & Koff, 1986).

Support for Buss' theory of the two types of shyness was found in a study by Bruch, Giordano, and Pearl (1986), who found that it was possible to identify college students who were shy and self-conscious, but not fearful, and students who were shy and fearful, but not self-conscious. Fearful shy differed from the self-conscious shy in reporting more autonomic reactivity. Schmidt and Robinson (1992) were similarly able to separate fearful shy from self-conscious shy college students. Fearful shy reported lower self-esteem than self-conscious shy.

Bulik (1995) suggested that self-conscious shy girls who are exposed to an emphasis on thinness and appearance, may transfer their early self-conscious concerns about performance

and behaviour to concerns about weight and appearance. Weight concerns in turn could fuel dieting and other disordered eating behaviours. Bulik's suggestion involves a number of different assumptions that are listed below:

1. Women with eating disorders suffer from social anxiety.
2. The social anxiety arises prior to the eating disorder.
3. The particular type of social anxiety experienced is most closely related to Buss' concept of self-conscious shyness. Self-conscious shyness is characterised by cognitive distress over potential negative evaluation and excessive concerns with other people's evaluation of the public self, i.e. public self-consciousness. It does not involve fearfulness, but feelings of being awkward, foolish, and vulnerable. Nor does it involve physiological arousal, except for blushing. Self-conscious shyness also has a motor component which involves fumbling, disorganisation, and inhibition of social behaviour. If the hypothesis is correct, these aspects of social anxiety should be present in individuals with eating disorders.
4. Social anxiety is etiologically linked to eating disorders.
5. Social anxiety is a risk factor for eating disorders through its effect on concerns about appearance and weight.
6. The aspect of social anxiety that provokes weight concerns is the self-consciousness seen in the self-conscious shy.
8. If self-conscious shy girls are exposed to an emphasis on thinness, they may transfer their self-conscious concerns about performance and behaviour to concerns about weight.
9. Concerns about weight and appearance prompt dieting and other disordered eating behaviours.

Bulik's hypothesis has not been subjected to direct empirical testing. However, a relatively large body of literature exists that is relevant to the assumptions that form part of the hypothesised relationship between social anxiety and eating disorders, and these will be reviewed in the following section.

Social anxiety in women with eating disorders

The degree of social anxiety experienced by women with eating disorders has been assessed in several studies. In a study by Pillay and Crisp (1977) 11 females with AN whose weight had been newly restored reported greater social avoidance and distress as compared with female students. Social avoidance and distress was measured using Watson and Friend's (1969) Social Avoidance and Distress Scale (SADS). The scale measures both social distress, defined as being tense, upset, distressed, or anxious in social interactions, and social avoidance behaviour.

Similarly, Gross and Rosen (1988) found that the 65 females in their study with BN (according to DSM-III criteria) reported significantly more social avoidance and distress (as measured by the SADS) than their peers. The 8 males who met criteria for BN also reported considerably more social anxiety than their peers, but because of the low number of males with BN, no statistical comparisons were performed for males. Individuals with BN were identified in a sample of 1373 high school students, and were compared with the other students in the sample. Although students with BN reported increased social anxiety, the scores were not indicative of serious psychological distress. In contrast, Mizes (1988) failed to find significant differences in social anxiety between 20 women with BN and 20 non-eating disordered control females, despite using the same measure of social avoidance and distress that were used in the two previous studies. There was, however, a trend for women with BN to report more social anxiety. A closer examination of the differences in scores between the BN group and the control group in these two studies revealed that the differences were actually similar, and it thus appears that the difference in significance was due to the smaller sample size in Mizes study.

Striegel-Moore, Silberstein, and Rodin (1993) compared a group of 34 women with bulimia with 33 women with disturbed eating and 67 matched controls. The group of women with BN and the group with disturbed eating reported more social anxiety than non-eating disturbed controls on social anxiety as measured by the Social anxiety subscale of the Self-Consciousness Scale (SCS; Fenigstein, Scheier & Buss, 1975). The women with BN did not differ from those with subclinical eating problems in degree of reported social anxiety. The

social anxiety subscale of the SCS measures discomfort in the presence of others, but does not assess avoidance behaviours.

Some studies have attempted to ascertain whether the social anxiety experienced by women with eating disorders differs from that experienced by women with social phobia. Bulik, Beidel, Duchmann, Weltzin, and Kaye (1991) compared the social anxieties of women with AN, BN or social phobia, and a control group of undergraduate students, using the Social Phobia and Anxiety Inventory (SPAI; Turner, Beidel, Dancu, & Stanley, 1989). The SPAI was designed to identify social phobia, and assesses cognitive, behavioural, and somatic dimensions of social anxiety. Bulik et al. found that women with eating disorders endorsed clinically significant social fears that were equal in intensity to women with social phobia. The social phobia group scored higher overall than the eating disorder groups, suggesting that the social anxiety experienced by the socially phobic may be more severe. The eating disorder groups reported more fears of eating and drinking in public than the social phobia group. Their social anxiety was not limited to fears of eating and drinking in public, but generalised to other social situations. General non-social anxiety was higher in the eating disordered than in either the social phobics or controls.

Others have attempted to ascertain whether increased social anxiety is specific to eating disorders, or whether it is related to psychopathology in general. A study by Belfer, Crump, and Bradach (1991) compared the extent of social anxiety in agoraphobic patients, patients with an affective disorder, patients with AN, and patients with BN using the SCS. The patient groups showed equal levels of social anxiety. Schwalberg, Barlow, Alger, and Howard (1992) compared 20 women with BN with 20 women with panic disorder and 20 with social phobia on social anxiety as measured by the SCS (Fenigstein et al., 1975). Social anxiety was greater in the women with social phobia compared with the participants with BN. Severity of social anxiety did not differ between the BN and the panic disorder group.

From these studies it appears that women with eating disorders experience somewhat more social anxiety than the general population, and that their social fears are not limited to situations in which they have to eat or drink in public. Social avoidance and distress in social situations is commonly experienced by individuals with many different psychiatric disorders

(Turner & Beidel, 1988). Bulik et al.(1991) suggested that there may be different etiological and maintenance factors related to the social distress experienced by these different groups. They proposed that the social fears in BN and AN may be related to a fear of their body being scrutinised and found to be deviant from social ideals. Those with social phobia may be more concerned with whether their performance or behaviour is being perceived as inadequate.

If the social anxiety experienced by someone is excessive and avoidance behaviour is extensive and causes significant impairment in functioning, a diagnosis of social phobia may be given. The prevalence of social phobia in eating disorders has recently been addressed in a number of studies. Some studies also report on the age of onset of the social phobia compared with the eating disorder. This information is important in terms of our evaluation of the possibility that social anxiety plays an etiological role in eating disorders.

Bulik et al. (1995) examined comorbidity of anxiety disorders in 114 women with BN, and found that 30% could be diagnosed with social phobia. Comorbidity was assessed using the Structured Clinical Interview for DSM-III-R (SCID; Spitzer, Williams, Gibbon, & First, 1988). Retrospective reports from the clients suggested that the anxiety disorders almost always preceded the eating disorder. The study did not provide its own matched control group, but compared the rates of anxiety disorders with those found in the National Comorbidity Study in the United States. The prevalence rate of social phobia in the women with BN were twice that of the prevalence among women in the comorbidity study which was 15.5% (Kessler et al., 1994).

Similarly, Schwalberg et al. (1992) found a high comorbidity of social phobia in 20 women with BN, with a lifetime prevalence of 45%. Of the women who suffered from social phobia, 87.5% reported that the social phobia preceded the onset of BN. In comparison, 25% of a comparison group comprising 20 women with panic disorder, received a diagnosis of social phobia. Social phobia was assessed using the Anxiety Disorder Interview Schedule-Revised (ADIS-R; DiNardo et al. 1985). Care was taken in making the differential diagnosis between BN and anxiety disorders as described by DSM-III-R, so that anxieties that are integral to eating disorders, were not included when diagnosing an anxiety disorder.

Brewerton, Lydiard, Ballenger, and Herzog (1993) found a lower prevalence of social phobia compared with the two studies above in a group of 59 females with BN who had presented for treatment. Of these women, 17% met criteria for social phobia, and the focus of fear was not limited to fear of eating in public. The women expressed fears of writing and speaking in public and generalised social fears. In all but one of the women with social phobia, their phobia predated the onset of the eating disorder. Unfortunately, Brewerton et al. did not obtain a control group in order to compare the prevalence rate with the prevalence in the general female population. The prevalence rate found in their study is slightly higher than the 15% reported for women in the National Comorbidity Study in the United States (Kessler et al., 1994).

High rates of social phobia has also been reported in studies of women with AN. Halmi et al. (1991) found a lifetime prevalence of 34% for social phobia in a 10 year follow up study of 62 women with AN. This rate of social phobia was significantly higher than the 3.2% prevalence rate found in an age and sex-matched non-psychiatric control group. The women were interviewed using the Diagnostic Interview Schedule (Robins, Helzer, Groughon & Ratcliff, 1981). An even higher life-time prevalence of social phobia was reported by Deep et al. (1995) in a group of 24 women who had recovered from AN. Of these women, 42% had at some time suffered from social phobia, and the onset of the social phobia preceded the onset of AN in the majority. Deep et al. did not provide a control group to compare this prevalence rate with. Anxiety disorders were diagnosed using the Schedule for Affective Disorders and Schizophrenia- Lifetime Version-modified (SADS-L; Endicott & Spitzer, 1978).

In a pilot study Hsu, Crisp, and Callender (1992) interviewed 16 women with AN 22 years after onset of the eating disorder and obtained lifetime and current psychiatric diagnosis using the SCID (Spitzer et al., 1988). Anxiety disorders were more common during the active periods of AN or BN. 2 of the 16 women (12.5%) received a lifetime diagnosis of social phobia, and one received a "subthreshold" social phobia diagnosis. All three still received a diagnosis of an eating disorder, but none of them had current social phobia.

There is some evidence to suggest that social phobia may be more involved in the risk of the subtypes of eating disorders that involve binge eating and purging behaviour as opposed to

just exercise and dietary restraint. Studies separating the different subtypes of AN and BN according to the presence or absence of binge eating and purging can help us detect such differences. Laessle et al. (1989) compared women with concurrent AN and BN, restricting AN, normal weight BN, and BN with a history of AN. The 91 females participants were assessed using the German version of the Composite International Diagnostic Interview (CIDI; Semler et al., 1987). Laessle et al. found a greater lifetime prevalence of psychiatric disorders in the women with bulimic symptomatology compared with those with restricting AN. With regards to anxiety disorders, this difference was due to differences in the rates of social phobia and agoraphobia. The rates of social phobia was 23.8% for AN Restrictor subtype, 40% for AN Binge-Purge subtype, 48% for BN, and 56.5% for BN with a history of AN.

Braun, Sunday, & Halmi (1994) administered the SCID to 105 in-patients with eating disorders to compare subgroups of eating disorder patients on comorbidity. As in Laessle et al.'s (1989) study, Braun et al. also found greater prevalence of psychiatric disorders in the groups with bulimic symptomatology. The three bulimia groups tended to have higher rates of social phobia (18.3%) compared with the restrictor group (2.9%), however, the numbers were too small for statistical analysis. Of the 14 women with social phobia, 11 had a phobia of public speaking, seven had a general social phobia, and three had a writing phobia. 78.6% reported onset of the social phobia before the eating disorder, and 21.4% reported that the social phobia developed after the eating disorder.

From these studies it appears that as a group, women with BN and AN commonly report greater social anxiety than women without a psychiatric diagnosis, and that a relatively large proportion of the women with eating disorders experience sufficient distress and avoidance to receive a diagnosis of social phobia. Although recent comorbidity studies have been carried out using standardised assessment interviews, prevalence rates for the comorbidity of social phobia in BN and AN still vary widely. In the studies reviewed above, rates varied between 17%-45% for BN, and between 2.9%-42% for AN. Studies separating subtypes of AN and BN have discovered that different types of eating disorder symptoms vary in the extent to which they are associated with social phobia. The differences in reported prevalence rates may result from a failure to separate subtypes of AN and BN when assessing prevalence rates. The

lowest rates of social phobia was found in those with AN restricting subtype. This appears consistent with reports of lower overall psychopathology and less anxiety in restricting AN as reported in the overview of individual risk factors for eating disorders (Laessle et al., 1989). Thus it is possible that Bulik's theory of the role of social anxiety in the development of eating disorders is more appropriate for the subtypes that involve binge eating and purging.

The lack of matched control groups in many of the comorbidity studies constitutes a serious limitation of these studies. However, in the two studies that did obtain a non-psychiatric control group, rates of social phobia in the eating disorder group far exceeded that of the control group, and the prevalence rates reported in the other studies generally exceeded the rates reported in the United States national comorbidity study. Bulik (1995) has noted that comorbidity studies may overestimate the true comorbidity of eating and anxiety disorders as they all use clinically referred samples. Epidemiological studies are needed to confirm the data from clinical samples. Unfortunately no epidemiological study has reported specifically on the comorbidity of social phobia and eating disorders.

The differential diagnosis between eating disorders and social phobia presents special challenges, as some of the fears may be overlapping, and may artificially increase the number of people receiving both diagnoses. Cooper and Fairburn (1986) found that the anxiety reported by women with BN in their study was usually attributable directly to the eating disorder itself. The situation anxiety experienced by almost three-quarters of the eating disordered population was frequently related to social eating or being seen in public when "feeling fat". Based on their observations, Cooper and Fairburn suggested that many of the anxiety symptoms in bulimia may be secondary to the disorder itself, rather than of primary significance. The use of the DSM-III-R has probably meant an improvement in differential diagnosis from earlier studies in that it excludes fears endemic to eating disorders in the diagnosis of social phobia in women with eating disorders, such as fears relating to eating in public. But more subtle relationships between concerns about weight and shape and social anxieties may exist, and may be interpreted differently by interviewers. However, not withstanding the argument that social anxiety in many situations may be a consequence of the eating disorder, most studies assessing retrospectively the age of onset of the two disorders found that social phobia most often preceded the eating disorder.

Shyness in women with eating disorders

Bulik (1995) hypothesised that the social anxiety experienced in eating disorders may be of the kind described by Buss as self-conscious shyness. She referred to a number of early studies suggesting that between 33-80% of women with AN are shy (King, 1963; Morgan & Russel, 1975; Rotherberg, 1988; Rowland, 1970; Warren, 1968). These early studies often reported shyness on the basis of clinical impression rather than standardised instruments or interviews, thus making it hard to evaluate the basis for, and validity of their conclusions. Many used broad terms when reporting on the psychological make-up of their patients. .Morgan and Russel (1975) for example noted that 37% of their patients with AN reported neurotic problems, described as marked shyness, nervousness, or excessive dependence on the family. In addition, the syndrome defined as AN around 1960-1970 was more inclusive than the diagnostic category is today, and this makes the studies hard to interpret.

In a recent study by Steinhausen & Vollrath (1992), 42 adolescents with AN hospitalised for treatment rated themselves as significantly more shy and sensitive than did the secondary school students used as controls. The authors used a semantic differential questionnaire where the participants rated themselves in terms of 16 bipolar adjectives pertaining to their personality. Whereas the girls with AN as a group characterised themselves as only tending slightly more to shy than outgoing, they saw themselves as very much more sensitive than thick skinned. Shy and sensitive loaded on the same factor and were highly correlated for the anorexic adolescents. The instrument assessed only self-labelled shyness, and thus gives limited information about what the shyness label entails.

Herzog, Pepose, Norman, and Rigotti (1985) found that female medical students with BN reported impairment in social and leisure adjustment with the most frequent sources of impairment being shyness or feeling uncomfortable with people, difficulties in coping with having ones feelings hurt or offended, difficulties in talking about feelings and problems, and feelings of loneliness. In contrast, medical students with AN did not report more impairment in social adjustment than did other students.

These studies support the hypothesis that women with eating disorders are more shy than non-psychiatric controls. Research on shyness in eating disorders has often failed to define

shyness succinctly, and has not taken into account the rich cluster of behaviours, cognitions, feelings, and bodily reactions covered by the "shyness", as well as the severity of the problem. Also the researchers have not addressed the question of different types of shyness. This makes it difficult to draw conclusions from these studies regarding the nature of the shyness experienced by women with eating disorders. More resent research has studied some of the more specific components believed to be part of shyness. According to Buss' (1986) theory of a fearful and a self-conscious type of shyness, the cognitive components of self-conscious shyness are public self-consciousness and fear of negative evaluation, and the behavioural components are fumbling, disorganisation and behavioural inhibition in social interactions. The relationship between the subcomponents of self-conscious shyness and eating disorders will be reviewed next.

Public self-consciousness refers to an intense concern by individuals with their physical appearance, their style of behaviour, and the impression they make on others (Buss, 1980; Fenigstein et al., 1975). Systematic data on the degree of public self-consciousness in women with eating disorders is scarce (Heatherton & Baumeister, 1991). One exception is the study by Striegel-Moore et al. (1993). This study found that women with BN and women with disturbed eating scored higher than 67 non-eating disturbed matched controls on public self-consciousness as measured by the Self-Consciousness Scale (Fenigstein et al., 1975). The 7 item public self-consciousness subscale has items like "I usually worry about making a good impression" and "I am self-conscious about the way I look".

Some indirect evidence also exists that supports a relationship between BN and public self-consciousness. Heatherton and Baumeister (1991) refer to several researchers that have remarked on the strong egocentric biases found among females with BN (Bauer & Anderson, 1989; Johnson & Connors, 1987; Weisberg, Norman & Herzog, 1987), in the way they assume events are directed at them. Such bias has been shown to be the result of self focused attention (Fenigstein, 1984). The same egocentric bias has also been described in AN by Garfinkel and Garner (1982), who gave the following example "Two people laughed and whispered to each other when I walked by. They were probably saying that I looked unattractive. I have gained three pounds." (p.157).

Public self-consciousness may not be specific to eating disorders, but may be common to a wide range of psychopathology. Schwalberg et al. (1992) compared 20 women with BN, 20 women with social phobia, and 20 with panic disorder on public self-consciousness as measured by the SCS. There were no significant differences in self-consciousness between the three groups. Similarly, Belfer, Crump, and Bradach's (1991) study compared public self-consciousness in agoraphobic patients, patients with an affective disorder, patients with AN, and patients with BN, using the SCS. The patient groups showed equal levels of public self-consciousness.

People who are high in public self-consciousness are motivated to present themselves to others in ways that are calculated to avoid disapproval and rejection (Leary, 1986). Fear of disapproval and criticism from others is also an important factor in self-conscious shyness. The fear of gaining weight in women with eating disorders is generally interpreted as a fear of falling short of own goals and standards. However, the fear of weight can also be conceptualised as a fear of negative evaluation by others (Bulik et al., 1991). Pillay and Crisp (1977) compared 11 females with the diagnosis of AN whose weight had been newly restored, with 60 female students and found that the women with AN showed more fear of negative evaluation, as assessed by the Fear of Negative Evaluation scale (FNE; Watson & Friend, 1969). They interpreted these results as supporting their claim that the shyness and social avoidance seen in adolescent with AN acts as a protection against feared criticism.

Segal and Figley (1985) studied fear of negative evaluation in a population of 204 female undergraduate students. They identified a group of students with BN with the use of a 25 item version of the Eating Attitudes Test (Garner & Garfinkel, 1979), and the Disordered Eating Test (DET; Segal & Figley, 1985). The women with BN scored significantly higher than the other students on the FNE scale. Segal and Figley stated that nearly one-fourth of their sample had BN. This high prevalence rate probably means that they have included women with less severely disturbed eating in their sample of women with BN. Thus fear of negative evaluation may be related to a wide range of severity of disturbed eating and not just clinical cases.

Similarly to social avoidance and distress and public self-consciousness, fear of negative evaluation is common in most anxiety disorders, and is also associated with depression, and

general emotional distress (Turner, McCanna & Beidel, 1987), and thus does not appear to be a risk factor that relates specifically to eating disorders. The need for social approval is related to fear of negative evaluation, as approval signals that the feared outcome has not occurred. According to Leary (1983), people who have a high need for approval are also at risk of experiencing social anxiety. As discussed in the section on theoretical developments, a number of authors have proposed that an excessive need for approval and sensitivity to the perceived expectations of others, play an etiological role in the development of bulimia. In a society that place a high value on thinness, these women attempt to conform to the ideal through vigorously controlling their food intake. Consistent with this theory, Mizes (1988) found that demand for approval was quite highly related to BN in a sample of 20 women with BN and 20 control women.

A high need for approval has also been found in AN. Strober (1980) compared 22 females aged between 12.8 to 16.5 who had been admitted for a first episode of AN, with a group of females with depression and a group with a personality or conduct disorder diagnosed according to the DSM-III. Adolescents with AN reported greater need to seek approval by responding in a socially desirable fashion than the two other groups as measured by the Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1964). Hewitt, Flett, & Ediger's (1995) study of cognitive distortions confirmed that disordered eating is related to a belief that one must be acceptable to others by meeting their perceived perfectionistic standards.

One study failed to find a higher need for approval in 20 women with eating disorders compared to 27 women from an introductory psychology class (Beren & Chrisler, 1990). As in Strober's (1980) study the Marlow-Crowne Desirability scale was used to measure need for approval. Compared with Strober's AN group, both groups in this study scored much lower on the social desirability scale. Some differences between the samples must be noted. The BN group in Beren et al.'s study was comprised of women with both current and former AN or BN recruited from a self-help group, as well as 9 students who were originally part of the control group, but were diagnosed with BN based on their answers to the Eating Disorders Inventory (Garner, Olmsted & Polivy, 1983). The eating disorders of these women are likely

to be much less severe than in Strober's study, where the participants were recruited from hospital.

Self-conscious shyness is also believed to have a behavioural component which is expressed through fumbling, disorganisation, and inhibition of social behaviour (Buss, 1986). Inhibition of social behaviour is characterised by quietness and withdrawal, reluctance to initiate conversations, awkward body language, and gaze aversion (Cheek & Melchior, 1990). Few studies have been designed to assess these behavioural components of shyness in eating disorders. Some studies have reported that women with eating disorders show impaired social skills (Grissett & Norvell, 1992; Strober, 1980), but these studies have not explored social skills in terms of the behaviours relevant to shyness.

Becker, Bell & Billington (1987) found that among 547 US freshman women, those identified by questionnaire as having BN reported more fears of abandonment and a lack of autonomy in relationships than the non-bulimic control group, as measured by the Bell Object Relations Inventory (OR; Bell, Billington & Becker, 1986). But women with BN did not perceive themselves as any more socially inhibited, socially incompetent, or afraid to participate in relationships with the opposite sex than did the women with no eating disorder. The authors interpret these results as suggesting that previous reports of greater social anxiety in women with bulimia may stem from fears of pain and rejection in relationships more than from fears of incompetent social performance. This study contradicts the hypothesised relationship between eating disorders and shyness when shyness is seen as including a component of behavioural inhibition.

Public self-consciousness is seen by Buss as the hallmark of self-conscious shyness. Women with eating disorders appear to be more publicly self-conscious then the population at large, but there is not much research in the area. Most studies also show that fear of negative evaluation and desire for approval is increased compared with female controls. Similar to social distress and avoidance of social situations, public self-consciousness and fear of negative evaluation appears to be a nonspecific factor associated with a wide range of psychopathology rather than with social phobia and eating disorders specifically. The behavioural aspects of shyness have received little attention within the eating disorder

literature. The literature on social skills does suggest that eating disorders may be associated with some impairment of behaviour in social situations. However, the one study that asked specifically about behavioural inhibition did not find an association between behavioural inhibition and BN. Buss (1986) also separates fearful shyness from self-conscious shyness in terms of physiological arousal in social situations. Fearful shyness is characteristed by activation of the sympathetic division of the autonomic nervous system, and may involve a potentially intense state of bodily arousal. Self-conscious shyness in contrast, does not involve physiological arousal other than that seen when the parasympathetic nervous system is activitated in blushing. The literature review did not reveal any studies on autonomic arousal in social situations in individuals with an eating disorder. More studies on behavioural and physiological aspects of shyness in individuals with eating disorders, as well as the other components that separate the two types of shyness are needed in order to assertain whether Buss's theory of shyness provides a useful framework for understanding the nature of the social anxiety experienced by women with eating disorders.

The relationship between social anxiety and weight concerns

Bulik (1995) suggested that social anxiety may be a causal factor in the development of eating disorders through its effects on concerns about weight and appearance. She argued that the aspect of social anxiety that provokes weight concerns may be the self-consciousness seen in the self-conscious shy. In the following, research relevant to the hypothesised relationship between weight concerns and social anxiety, shyness, and public self-consciousness will be reviewed.

Cash, Cash & Butters (1983) reported that in their sample of 51 female college students, those who were socially anxious were more dissatisfied with their body and rated themselves as less physically attractive than their less anxious peers. Body satisfaction was assessed by the Body Satisfaction Questionnaire (Berscheid, Walster & Bohrnstedt, 1973), and social anxiety was assessed with the social anxiety subscale of the Self-Consciousness Scale (Fenigstein et al., 1975). In South Africa, Theron, Nel, and Lubbe (1991) found an association between social anxiety and negative body image for both men and women in a sample of 267 undergraduates. Body image was measured by the Physical Self-concept subscale of the Tennessee Self-concept Scale (Fitts, 1965).

One study obtained information relevant to the relationship between social anxiety and body dissatisfaction in childhood. Klonsky, Dutton & Liebel (1990) obtained current and retrospective reports of body satisfaction at different ages in a sample of 53 male and 55 female college freshmen. Women high in social anxiety reported less satisfaction with their body both at present, during early childhood (age 5 and younger) and during adolescence (age 13 to high school graduation) than their less anxious peers. Socially anxious men did not show dissatisfaction with their body. The authors designed their own body satisfaction scale using a 7-point Likert scale, but did not give enough information about it in order for its merits to be evaluated.

Comparing 36 African-American, 34 Asian-American, and 28 Caucasian female college students, Akan and Grilo (1995) found an association between high social anxiety and body-dissatisfaction and problematic eating attitudes and behaviours only in the African-American group. Body dissatisfaction was assessed with the Body Shape Questionnaire (BSQ; Cooper,

Taylor, Cooper & Fairburn, 1987) and eating attitudes were assessed by the EAT (Garner & Garfinkel, 1979). The failure to find a significant relationship between social anxiety and body dissatisfaction in Caucasians and Asian-Americans could have been due to the small number of participants from each ethnic group.

In a sample of 200 women, Thomas and Freeman (1990) found that increased social anxiety was associated with the perception of lower levels of sexual attractiveness, but not with weight concerns as measured by the Body Esteem Scale (Franzoi & Shields, 1984). Striegel-Moore et al.'s (1993) study with 222 women aged between 16 and 50 confirmed the association between social anxiety and body esteem as measured by the Body Esteem Scale. Striegel-Moore et al. did not analyse the subscales of the BES separately, so it is not known which aspects of body esteem accounted for the relationship with social anxiety in this sample. In contrast to Thomas and Freeman, Hee Kwon (1992) found that increased social anxiety was associated with more dissatisfaction with weight and shape in a sample of 172 working women and 172 female college students, although correlations were low.

Research using the Restraint scale (Herman & Polivy, 1975) and the social anxiety subscale of the SCS have obtained conflicting results in terms of the relationship between dieting and social anxiety. Blanchard and Frost (1983) found that among 205 female undergraduates, the concern for dieting subscale of the RS, but not the weight fluctuation subscale, showed a weak, but significant positive correlation with social anxiety. Klesges (1984) found that social anxiety did not predict dietary restraint. He did not analyse the two subscales, concern for dieting and weight fluctuation, separately. A third study by Hamilton, Falconer & Greenberg (1992) actually found a negative relationship between social anxiety and concern for dieting in 40 male and 48 female undergraduates. His study was the first to combine public self-consciousness and social anxiety in a regression analysis. The analysis showed that after the variance in concern for dieting accounted for by public self-consciousness had been partialled out, social anxiety emerged as a significant negative predictor of concern for dieting, that is, increased social anxiety was associated with less concerns about dieting.

The possibility of an association between shyness and dissatisfaction with appearance has also been addressed. Cheek, Melchior & Carpentieri (1986) found that shyness correlated

negatively with five dimensions of self-esteem, including physical appearance. In Liebman and Cheek's (1983) study, shy women underestimated their attractiveness compared to observer ratings, whereas non-shy overestimate their attractiveness. The shyness - attractiveness correlation was significant only for those who rated physical appearance as being very or extremely important to their overall self-concept. Dion, Dion & Keelan (1990) constructed and administered a measure of appearance anxiety to 300 university students. The Appearance anxiety scale includes items that assess nervousness with regards to other's evaluation of one's appearance, self-consciousness about appearance, and dissatisfaction with one's appearance. Appearance anxiety correlated positively with shyness as well as social avoidance and distress.

Bruch et al.'s (1986) study of the relationship between shyness and body dissatisfaction is of particular interest to the present study. Bruch et al. assessed body image in self-conscious shyness and fearful shyness separately. The authors attempted to assess the validity of Buss' conceptualisation of shyness as well as the relationship with body image. Shyness was assessed with the battery of instruments suggested by Buss (1986) as ideal in differentiating the two types of shyness. 289 students were given the Revised Cheek and Buss Shyness Scale (RCBSHY; Cheek, 1983), the Fearfulness subscale from the Emotionality, Activity, and Sociability Temperament Survey (EAS; Buss & Plomin, 1984), and the Public self-consciousness subscale of the SCS in order for them to be classified according to shyness groups. Participants who rated themselves as currently shy, scored one-half of a standard deviation above the mean on shyness and fearfulness, and who scored one half of a standard deviation below the mean on public self-consciousness, were classified as fearful shy. Participants who rated themselves as currently shy, scored one-half standard deviation above the mean on shyness and public self-consciousness, and who scored one-half standard deviation below the mean of fearfulness, were classified as self-conscious shy. Participants who scored low on both shyness, fearfulness and public self-consciousness were classified as non shy. This procedure of assigning participants to shyness groups followed the recommendations by Buss (1986). A final sample of 36 women and 36 men who fit the criteria for one of the groups were selected, forming groups of 24 participants in each. Of the two shyness groups, both the fearful and the self-conscious shy rated themselves as less attractive compared to non shy controls on the Physical Appearance Evaluation scale (PAE) from the Winstead and Cash (1984) Body Self Relations Questionnaire. The two shyness groups did

not differ from each other. The authors claimed that since, according to Buss (1980), one consequence of shyness is an excessive anticipation of negative evaluation by other people, and since physical attractiveness has been found to be a primary source of interpersonal evaluation (Berscheid & Walster, 1974), it seems reasonable to assume that shy people could become highly sensitised to even minor deficiencies in their physical appearance and come to view themselves as less attractive when compared to some general standard.

The studies reviewed here suggest that females who are socially anxious and shy are more dissatisfied with their body and appearance than others. Two out of three studies including male participants found that social anxiety was associated with body dissatisfaction for males as well. It is less clear whether dissatisfaction with body weight in particular is related to social anxiety. Studies have found both a positive relationship, a negative relationship, and no relationship between social anxiety and weight concerns and dieting. In contrast, studies of the relationship between public-self consciousness and weight concerns have found a more consistent positive relationship between the two factors. Blanchard and Frost (1983) administered the Restraint Scale (RS; Herman & Polivy, 1975) and the Self-Consciousness Scale to 205 female undergraduates. The concern for dieting subscale of the RS was positively correlated with public self-consciousness, while the weight fluctuation subscale was not. These results were replicated by Hamilton, Falconer, and Greenberg (1992) who found that concern for dieting was associated with public self-consciousness in both the 40 male and the 48 female undergraduate participants. The relationship between concern for dieting and public self-consciousness as measured by the SCS has been found repeatedly and thus appears to be relatively robust (Thomas & Freeman, 1990; Heatherton, 1993). Heatherton (1993) found additional support for the link between self-awareness and dieting using the Exner Sentence Completion Task in addition to the SCS. Chronic dieters were highly and negatively self-focused on this measure also.

Striegel-Moore et al. (1993) found that public self-consciousness was negatively related to body esteem in a sample of 222 women aged between 16 and 50. A number of other studies have also found that women high in public self-consciousness are more dissatisfied with their bodies than those low in public self-consciousness (Klonsky et al., 1990; He Kwon, 1992; Theron et al., 1991; Dion et al., 1990). There is some evidence to suggest that the relationship

between public self-consciousness and body dissatisfaction may be consistent across different ethnic groups. Akan and Grilo (1995) found a relationship between high public self-consciousness and body dissatisfaction and greater levels of problematic eating behaviours and attitudes in African-American, Asian-American, and Caucasian college women.

One exception to these generally consistent results is Cash et al. (1983) study with a sample of 51 female college students that found no relationship between public self-consciousness and self-perceived attractiveness as rated on a 10-point Likert scale. Since Cash et al. used only one item to measure perceived attractiveness, the measure may be less valid and reliable than the more established multiple item instruments assessing body satisfaction that have been used in other studies.

In summary, the studies reported above show a relatively consistent relationship between body dissatisfaction and social anxiety and shyness. One exception was the study by Akan and Grilo (1995), who found this relationship only for female African American college students, and not for Caucasians or Asian-Americans, but this study was limited by a very small number of participants from each ethnic group. Both fearful shy and self-conscious shy appear to be more dissatisfied with their appearance than their not shy peers. The one study obtaining retrospective reports also suggested that a relationship between social anxiety and body dissatisfaction may be present in children and adolescents as well as in adults. Research on the relationship between social anxiety and weight concerns and dietary restraint has yielded contradictory results, and more research is needed to clarify this relationship. Striegel-Moore et al. (1993) suggested two ways in which body dissatisfaction and social anxiety may be related. The body, particularly a woman's body, is a social object that is scrutinised by others. If a women feels inadequate in her physical appearance, social anxiety may result. Also, if a women feels insecure about herself in general, her worries about how others perceive her are likely to include, and perhaps become focused on, her body. No conclusion about the direction of causality between social anxiety and body dissatisfaction can be drawn from the studies reviewed here.

Similar to social anxiety and shyness, public self-consciousness also appears to be related to body dissatisfaction. In addition, high public self-consciousness has consistently been found to

be associated with weight concerns and dieting, providing support for the hypothesis that self-consciousness might be one of the factors involved in triggering weight concerns in adolescents who go on to develop an eating disorder. One study failed to find an association between public self-consciousness and self-perceived attractiveness. This could have been due to the simple measure of self-perceived attractiveness. In addition, the relationship between public self-consciousness and body satisfaction may also be mediated by other variables, such as actual appearance and body weight, the importance placed on attractiveness in the environment, and self-esteem.

In a review of the social psychological implications of obesity research, Krantz (1978) proposed that the deviant status of overweight persons should result in heightened self-consciousness and exaggerated concern for self-presentation. In that case, the relationship between self-consciousness and body-image dissatisfaction and dieting could be mediated by the effects of obesity. This is consistent with Leary's (1986) claim that public self-awareness is high when people are at the centre of attention and if they believe they possess a physical (for example overweight) or a social stigma (people know something about them that is socially undesirable). Alternatively, as Bulik (1995) suggested, individuals who are strongly aware of how they are being perceived by others may become more concerned about their weight, particularly if others around them emphasise thinness as the ideal. Individuals who are high in public self-consciousness are strongly aware of societal norms and adhere more closely to them than persons low in public self-consciousness (Buss, 1980). Accordingly, they may also attempt to adhere to norms about thinness.

I.III WEIGHT CONCERNS IN CHILDREN

So far this reviewed has focused on studies with older adolescent and adult participants. This is due to the lack of research on the relationship between weight concerns/disordered eating and social anxiety, shyness, and public self-consciousness in children and young adolescents. Since eating disorders with the associated excessive concerns about weight usually begin in adolescence, it is important to understand the development of weight concerns in children and adolescents. To understand how a young person becomes preoccupied with their weight and shape it is useful to know both how children and adolescents in general perceive issues surrounding body weight and shape, and what puts some children at risk of becoming more concerned than usual about their weight.

A number of studies have shown that the cultural ideal of attractiveness is acquired early in preschool years (Feldman, Feldman & Goodman, 1988; Hill et al., 1992). Children acquire an active dislike for obese body build by six to nine years of age (Feldman et al. 1988). Not only do children dislike obesity, but young girls have an ideal that is thinner than what they consider to be average weight (Collins, 1991; Koff & Rierdan, 1991). Children also learn to associate a fat figure with a number of negative characteristics. A study by Hill and Silver (as cited in Hill, 1993) found that British children rate both figures of fat boys and fat girls as having far fewer friends than their thin counterparts, being less liked by their parents, being very unhappy with their appearance, and performing poor in school. In response to a question about the worst thing about being fat, the most frequent answers in a group of 6th grade Boston girls were: feeling unattractive (29%), feeling bad about oneself (27%), getting teased (17%), and being unpopular (9%) (Koff et al., 1991). In a review of the literature, DeJong and Klerk (1986) concluded that girls seem to be less accepting of overweight same-sex peers than are boys, and the least accepting attitudes to overweight peers are found in industrialised, Western cultures.

Children who are overweight are clearly affected by the stigma attached to obesity. Body dissatisfaction is prominent and Hill, Jones and Stack (as cited in Hill, 1993) found that among 9 year olds, children in the upper 16% with regards to weight, scored significantly lower on a measure of body esteem than all the other children. Prospectively, increased body mass index between grade 4 and 6 is significantly associated with unfavourable changes in physical

activity attitudes, activity preferences, perceived physical activity competence, self-concept, and body image, suggesting that some children may be overconcerned with body shape and weight (Kolody & Sallis, 1995).

Although weight concerns are common in children who are overweight, weight concerns become more pervasive during adolescence, particularly for females. Attie and Brooks-Gunn (1989) have emphasised the need to take a developmental perspective that considers weight concerns and eating problems in adolescence by placing them in the context of challenges confronting individuals at different stages of adolescence. There is evidence to suggest that the time around menarche is particularly important with regards to the development of weight concerns. Dornbusch et al. (1984) reported that during puberty adolescent females evaluate the weight-gain associated with normal sexual development negatively, whereas boys evaluate their maturational changes positively. Most studies find that weight concerns and body dissatisfaction in girls increase around the age of 12-13 (Richards, Casper & Larson, 1990). Richards et al. (1990) have suggested that the major increase in subcutaneous fat during puberty is troubling to young adolescent girls, and that this and their sexual changes may lead to self-consciousness, a distorted and more negative body-image, and a desire to be thinner. Thus in their view, self-consciousness and weight concerns may be related because of the effects of weight gain, rather than self-consciousness leading to weight concerns. Negative effects of menarche on body image have also been found in New Zealand girls. Mason's (1995) study found that postpubertal females were significantly more dissatisfied with their bodies, particularly in relation to weight, whereas prepubertal females had a more positive body image.

The onset of dating usually occurs around the time of puberty. Cauffman and Steinberg (1996) found that the combined effects of menarche and dating in young adolescent girls increased drive for thinness and disordered eating. Sexual activity was correlated with dieting and disordered eating independent of menarcheal status. French et al.'s (1995) study of adolescents also found an association between frequent dieting and purging and sexual activity. Dating and sexual relationships may make girls more susceptible to social pressures to appear attractive (Cauffman & Steinberg, 1996).

Children's concerns about being or becoming overweight are reflected in their eating behaviours. Maloney, McGuire, Daniels, and Specker (1989) studied dieting and eating behaviour in 356 boys and girls aged 8-13 living in Cincinnati. As many as 40% of the children said they exercised to lose weight, 12% restricted calories, and 1% admitted to vomiting to control weight. Koff and Rierdan (1991) studied weight and dieting attitudes in 206 sixth grade girls in Boston. Among these girls, 53% of the girls had dieted, and 17% dieted frequently. Almost all girls said they paid attention to what they were eating, and half considered the calorie content of the foods they ate and said they gave too much time and thought to food. The majority of girls restricted their food intake in front of others. The authors pointed to the pervasiveness of what they called the "dieting mentality", i.e. avoiding fattening foods, considering calories, thinking excessively about food, feeling guilty after overeating, and exercising to lose weight, even in girls who did not consider themselves to be overweight, and who were not dissatisfied with their current weight.

Different cultures vary in the extent to which they emphasise appearance, and in the body shape they promote as ideal, and these differences affect the level of weight concerns in children and adolescents. This makes it difficult to apply results from studies in the United States or Europe to the New Zealand context. Very few studies have assessed weight concerns in New Zealand children, but the few existing studies have shown that New Zealand children from eight years of age do express concerns about their weight. One New Zealand study found that among 8-13 year old children, 16% of girls and 12% of boys had been on a diet to lose weight. And although only 14 % of girls thought they were too fat, 38% wished to weigh less (Bagby, 1993). Another New Zealand study assessed body image in 48 boys and 44 girls aged 11-13, and found that 30% of the girls, and 10% of the boys had at some time changed their diet in order to lose weight (Mason, 1995). The most commonly reported changes to the diet were eating less sweets and fatty foods. Only a few participants resorted to a low-calorie or "starvation" diet, most of whom were females. An approximately equal proportion of males had attempted to gain weight as had attempted to lose weight. Boys did not appear very concerned about their body, as noted in their comments about body parts, whereas girls showed stronger opinions and feelings, particularly in relation to being slightly heavy or overweight. Although on a small scale, these two studies suggest that weight

concerns are relatively common among New Zealand girls, and that although boys express less concern, about 1 in 10 have attempted to lose weight through dieting.

The assessment of weight concerns and disturbed eating in children is important not only because weight loss behaviours can constitute a health risk, but also because milder forms of weight concerns and disturbed eating may develop into clinically recognisable eating disorders. The hypothesis that weight concerns, dieting, and disordered eating exist along a continuum and that a transition occurs from undifferentiated forms of disturbed eating to the recognised clinical entities, is widely endorsed. Abnormal weight concerns and eating attitudes are thought to represent an early stage in the continuum (Johnson-Sabine, Wood, Patton, Mann & Wakeling, 1988). There is considerable evidence to suggest that some adolescents move from weight concerns and dieting to disordered eating over time. Weight concerns and body dissatisfaction are significant predictors of the onset of disturbed eating attitudes and behaviours prospectively (Attie et al., 1989; Garner et al., 1987; Gralen, Levine, Smolak & Murnen, 1990; Striegel-Moore et al. 1989). Furthermore, Patton et al.'s (1990) longitudinal study found an eight times increase in risk of developing disordered eating for girls who were dieting. In a prospective study of 887 girls aged 11-12 at the start of the study, a measure of weight concerns was the best predictor of the development of disordered eating 3 years later (Killen et al., 1994). Some individuals have also been found to move along the spectrum from less severe disturbed eating to subclinical or clinical eating disorders (Shisslak et al., 1995). These studies all provide support for the notion that milder forms of weight concerns and disturbed eating differ from eating disorders in degree rather than quality.

The continuum hypothesis has lead to a search for risk factors for weight concerns, dieting, and less severe forms of disturbed eating, with the idea that the same factors that put someone at risk of these milder eating related problems may also be involved in the development of eating disorders. This argument is important to the present study in that this study assumes that weight concerns in a non-clinical population share similar risk factors with the excessive weight concern found in eating disorders. Studies of risk factors for weight concerns and disturbed eating generally find similar risk factors as those identified in clinical samples. Pressure for thinness in the environment increases the risk of experiencing weight concerns and developing symptoms of eating disorders. Weight concerns and disturbed eating is more

common among girls who participate in certain sports or dancing where thinness is demanded (Brooks-Gunn et al., 1989), and is also associated with regular exposure to fashion magazines that promote thinness and provide information about weightloss strategies, and weight/shape related teasing and criticism by the family (Levine, Smolak & Hayden, 1994). Levine et al. (1994) found that 12 % of Middle School girls reported reading at least one fashion magazine regularly, and being exposed to a strong emphasis on thinness from both peers and parents. The emphasis on thinness was reflected in the girls' drive for thinness and disordered eating attitudes and behaviour. The pressure for thinness was not a consequence of being overweight in the girls, whose weight did not differ from average. Having acquired a belief that friends would like you more if you were thinner is also related to disordered eating (Maloney et al., 1989; Oliver & Thelen, 1996), however, it is not known whether this belief arises from an emphasis on thinness among friends, or the girls' own belief system.

Furthermore, familial and individual factors such as higher family stress, and greater risk of having experienced physical or sexual abuse (French et al., 1995), current and past overweight and body dissatisfaction (Attie et al., 1989; Hill, 1993; Johnson-Sabine et al., 1988), as well as anxiety and depression (for example Brooks-Gunn et al., 1989; Button, Sonunga-Barke, Davies, & Thompson, 1996; Fisher, Pastore, Schneider, Pegler, & Napolitano, 1994), have been found to increase the risk of weight concerns and disturbed eating. The similarity of these risk factors with those identified in clinical samples, support the usefulness of assessing risk factors in a non-clinical population. Most of the studies of risk factors have been cross-sectional studies. These studies can not draw conclusions about causality, however, they do provide information about variables that would be valuable to study in more resource demanding longitudinal designs. Among the factors that have been found to predict disordered eating longitudinally are; low self-esteem (Button et al., 1996), body dissatisfaction (Garner et al., 1987), and interpersonal distrust (Furukawa, 1994).

Very little research has been done on the relationship between social anxiety and weight concerns in children. One study assessed the relationship between weight concerns and social avoidance and distress in adolescents. In a sample of 1373 high school students, Rosen, Gross, and Vara (1987) studied the psychological adjustment of adolescents who were attempting to lose or gain weight. Weight change efforts were not associated with different degrees of social

anxiety (as measured by the Social Avoidance and Distress Scale) in girls or boys. Social anxiety was also not correlated with dietary restraint, as measure by the Restraint Scale. Entered into a regression analysis, social anxiety turned out to be a significant negative predictor of dietary restraint for girls, although the amount of variance predicted was minimal (0.7%). Despite their hypothesis that adolescents who diet exhibit poorer psychological adjustment than those who do not attempt to change their weight, the authors failed to comment on why greater social anxiety should predict less concerns about weight.

Another study has assessed the relationship between dieting and purging and the need for approval in adolescents aged 12 through 20 years (French et al., 1995). More peer acceptance concerns, such as concerns about treatment by friends, being liked by others, losing a best friend, and concerns with appearance, were associated with frequent dieting and purging behaviours. The authors suggested that a number of high risk behaviours that were more prevalent among those who were attempting to lose weight through dieting and purging (for example alcohol, tobacco, or drug use, delinquent behaviours, and early sexual intercourse), might be engaged in as an attempt to gain approval from peers. Dieting to receive a socially esteemed body shape may be another attempt to gain approval (French et al., 1995). Since need for approval is associated with social anxiety, these two studies present somewhat conflicting results. A lot more research in this area is obviously needed in order to test theories of a relationship between social anxiety and weight concerns.

Bulik (1995) proposed that self-conscious concerns about performance may be transferred to concerns about weight in environments that emphasise thinness. Although this hypothesis has not been tested, Simmons & Rosenberg (1975) found that girls aged between 8-15 often defined achievement in terms of their success in attracting boys, and cared much more than the boys about how good-looking they were. Thus it is conceivable that attractiveness can be perceived by self-conscious girls as another area they ought to achieve in. Since the emphasis on thinness becomes particularly strong in relations to the changes associated with puberty, it is possible that public-self consciousness will be a stronger risk factor after this developmental stage is reached. It is interesting that although many studies find an association between weight concerns, dieting and disturbed eating, and psychopathology and personality in middle adolescents (from approximately 13-14 years old), younger age groups often do not show

such a relationship (Attie et al., 1989; Richards et al., 1990; Gralen et al., 1990). In contrast, concrete events such as the onset of menarche and onset of dating predicts weight concerns, dieting and disturbed eating in 6th and 8th grade but not in older age groups (Gralen et al., 1990). Perhaps girls go through an adjustment phase in relation to the changes surrounding puberty during which moderate concerns about weight are normative, and psychological variables affect the ability to adjust to these changes over time. This possibility has consequences for the present study in that the relationship between weight concerns and social anxiety may change as a function of age, and the focus on psychological variables may limit the ability to detect risk factors in the youngest girls in the sample.

This review of the development of weight concerns in children suggests that the ideal of thinness is acquired early in childhood, and that children hold negative stereotypes about overweight children. Environments that emphasise thinness appear to increase drive for thinness and disordered eating in children and adolescents. Developmental changes in early adolescence, such as weight gain associated with puberty and dating, may serve to increase the emphasis on thinness at this particular developmental stage. A number of psychological factors have been found to be associated with increased risk for weight concerns and disordered eating. These risk factors may interact with developmental changes, and psychological factors may exert their influence only after the person has been exposed to certain developmental changes.

I.IV SUMMARY

Several researchers have proposed a relationship between social anxiety and eating disorders. This review supports claims that women with eating disorders experience more social anxiety than women in the general population, but because no premorbid measures of social anxiety in women with BN or AN have been made, it is not known whether social anxiety is a cause or a consequence of the eating disorder. Bulik (1995) hypothesised that social anxiety in children may be a risk factor for developing an eating disorder. Using Buss's (1986) theory of two types of shyness, a fearful and a self-conscious shy, Bulik suggested that the self-conscious shy

who are exposed to an emphasis on thinness and appearance, could transform their early self-conscious concerns about performance to concerns about weight and appearance. Weight concerns could then prompt dieting and other disordered eating behaviours. Bulik's hypothesis has not previously been tested. Some support for the theory was found in reports of an association between social anxiety/shyness, and dissatisfaction with one's body and appearance in students and adults. However, research addressing the relationship between social anxiety, weight concerns, and dieting has reported conflicting results, with some studies finding that those who are socially anxious are more concerned about their weight, some finding that they are less concerned about their weight, and some reporting no relationship between the two variables. An association between public self-consciousness and weight concerns has been found more consistently, with more weight concerns and dieting reported by those who experience greater public self-consciousness. Thus it is conceivable that a particular type of social anxiety that involves high levels of public self-consciousness is associated with weight concerns, as hypothesised by Bulik (1995). Despite the growing body of literature on weight concerns and its correlates in children, the relationship between social anxiety and weight concerns in children and pre-adolescents has received minimal attention.

Studies in the United States and Britain have found that children adopt the ideal of thinness at an early age, and that they associate being overweight with a number of negative characteristics. The time surrounding puberty for girls has been found to be a period of increased risk of concerns about being too fat. A number of individual characteristics are associated with weight concerns, and some of these characteristics appear to interact with developmental variables, so that their relationship with weight concerns only emerges after the age of 13-14. Most of our knowledge about children's concerns about their weight is derived from studies in the United states and Britain. Because cultural factors are very influential in creating these concerns, studies in these two countries can not easily be applied to other countries. To plan effective prevention efforts in New Zealand we need knowledge of weight concerns among New Zealand children.

I.V THE PRESENT STUDY

The present study aimed to test the relationship between shyness and weight concerns in children aged between 11-13. The study was also designed so that differences in weight concerns in fearful shy and self-conscious shy children could be assessed. In order to make this distinction, measures of fearfulness and reactivity assumed to be characteristic of fearful shyness, and a measure of self-consciousness assumed to be characteristic of self-conscious shyness, were included. The majority of studies assessing the relationship between social anxiety, body dissatisfaction, and eating disorders have used female participants exclusively. The focus on women in this area of research can be defended as eating disorders occur predominantly in women. However, some adolescent males also become concerned about being or becoming overweight and develop eating disorders, thus it is of interest to assess correlates of this type of weight concerns in males. For this reason, both males and females were included in this study.

The present study also aimed to provide information about weight concerns in New Zealand children. Killen et al. (1993) emphasised the need to target prevention efforts at children who are excessively concerned about their weight, therefore knowledge of the extent of weight concerns in New Zealand children, as well as the demographic distribution of excessive weight concerns thought to put someone at risk of developing eating disorders, is important in order to be able to plan targeted interventions with these children.

The present study set out to test the following three hypothesis:

Hypothesis 1: *It was expected that shyness would be positively related to weight concerns.* Research on the relationship between shyness and weight concerns in children is virtually non-existent. However, given the theoretical claims that social anxiety may play a causal role in the development of eating disorders through its effects on body dissatisfaction and weight concerns, and the relationship between social anxiety and body dissatisfaction reported in the literature, shy children were expected to show more concerns about their weight.

Hypothesis 2: *Higher self-consciousness was expected to be related to more concerns about weight.*

Bulik (1995) and other researchers have suggested that people with high levels of public self-consciousness may experience increased concerns about their weight and appearance, and several studies have found a positive relationship between self-consciousness and concern for dieting. The children in this study were expected to show a similar positive relationship between self-consciousness and shyness.

Hypothesis 3: *It was expected that self-conscious shy children would be more concerned about their weight than fearful shy children.*

Weight concerns in the two shyness groups as defined by Buss (1986) have not previously been addressed, although both shyness groups have been found to be dissatisfied with their appearance. Because of the positive relationship between public self-consciousness and weight concerns in the research literature, and the hypothesised causal effect of self-consciousness on the development of weight concerns, self-conscious shy children were expected to report more weight concerns than feaful shy children.

PART 2

II.I METHODS

Participants

Participants in the present study were 106 females and 71 males aged between 11 and 13 from three Intermediate schools in Christchurch, New Zealand. The schools were chosen on the basis of their location in areas of different socio-economic status, ranging from low- to upper-middle class, in order to get a representative sample of children in Christchurch. Demographic information for the participants is given below.

Age and gender:

	Age			Total
	11	12	13	
Females	39	39	28	106
Males	26	30	15	71

Ethnicity:

	N	%
European	157	88.7%
Total non-European	20	11.3%
Maori	12	6.8%
Pacific Islander	3	1.7%
Asian	2	1.1%
Other	3	1.7%

To obtain consent from the parents, the teachers handed information sheets and consent forms to the children that were to be brought back signed if the parents would allow their child to participate in the study (Appendix A). This proved to be an impractical procedure as many consent forms were lost or forgotten about, and it may have made the sample less representative than hoped for. The average participation rate for the first two schools was 58% of those asked. At the third school, 61% of one class participated, and 23 additional students were recruited from 5 more classes.

Procedure

The schools were visited on separate days, and the teachers arranged for the children who had permission from their parents to participate, to gather in a classroom in groups of 20 to 45 at different times of the day. The nature of the study was explained to the children, and those wishing to participate signed a consent form before the survey was handed out (Appendix B). In order to ensure confidentiality, the children were assigned an identity number for tracking purposes. The survey sheet contained only the ID number. It was emphasised that anyone could withdraw at any time should they wish to do so. Children who did not participate were given alternative work. The author was present while the students filled in the questionnaires to give instructions and to read all the questions and answers to them in order to avoid mistakes caused by misreading of questions, and to provide an opportunity for the children to ask questions. The questionnaires and the children's consent forms were then collected, and the children were given stickers as a reward for their participation. A brief unstructured discussion usually followed, where the children could talk freely about problems such as what it is like to be shy or why people are concerned about their weight. The children were then given the opportunity to speak to the researcher individually about the topics discussed.

Measures

Demographic information

Students reported their gender, age, grade, and ethnicity.

Weight concerns

The Weight Concerns scale (Killen et al., 1994): The Weight Concern scale consists of 5 items designed to ascertain subjects' fear of weightgain, worry over weight and body shape, importance of weight, diet history, and perceived fatness. The scale is reprinted in Appendix C. The questions vary as to the number of alternative answers that are provided. The alternative answers are numbered according to increasing severity of weight concerns. Scores on the scale range from 20 to 100.

In Killen et al.'s prospective study of 11-12 year old girls, the Weight Concern scale was found superior to the Eating Disorders Inventory (EDI; Garner & Olmsted, 1984) in predicting the development of future subclinical eating disorders. Girls scoring in the highest quartile on the Weight Concern measure had a 12% incidence rate of disordered eating by age 14.5, whereas girls scoring in the lowest quartile had an incidence of 2%. Test-retest reliability reported after 7 months was good, with a Spearman stability coefficients of .71. Overall, the measure appears to have good external validity and good test-retest-reliability.

Shyness, fearfulness, and autonomic reactivity

The Early Adolescent Temperament Questionnaire (EATQ; Capaldi & Rothbart, 1992): Three of 11 subscales of the EATQ, the shyness, fearfulness, and autonomic reactivity subscales, were used in order to assess shyness and the temperamental characteristics associated with fearful shyness. The scales are reprinted in Appendix C. The EATQ is based on Derryberry and Rothbart's (1988) temperament questionnaire for adults, and the questions have been reformulated so as to refer to everyday situations familiar to young adolescents. The Shyness scale measures self-reported shyness and behavioural inhibition to novelty or challenge in social situations. The Fearfulness scale measures distress to novelty, and the Autonomic reactivity scale assesses physical reactions often associated with tension, stress, or

excitement. Each of the sub-scales has between 7 and 9 items that the children rate on a 5-point Likert-type scale from 1 (very false) to 5 (very true).

Reliability and validity of the scales were tested using a sample of children aged 11-14 year old. The children were given other measures thought to be related to those assessed in the EATQ to assess validity of the scales. The Shyness scale correlated .77 with a 13 item extended version of the Cheek and Buss (1981) Shyness scale. The scale had good internal stability with a Cronbach's alpha of .79, and the authors reported a test-retest reliability of .84. The Fearfulness scale correlated .58 with the "How I feel" questionnaire that contains 20 items assessing fear and anxiety (Capaldi & Rothbart, 1992). A Cronbach's alpha of .74 and a test-retest correlation of .81 was reported. No satisfactory parallel scale to the autonomic reactivity was found. A Cronbach's alpha for internal consistency of .65 was reported. The test-retest correlation was .77. Overall the scales appear to have good internal consistency and test-retest reliability (Capaldi & Rothbart, 1992).

Public self-consciousness

The Imaginary Audience Scale (IAS; Elkind & Bowen,1979): The IAS was used as a measure of public self-consciousness. The IAS has been widely used and validated as a measure of self-consciousness in older children and adolescents (Adams & Jones, 1982; Bruch et al., 1986; Bruch & Heimberg, 1994; Cohn et al. 1988; Hauck, Martens & Wetzel, 1986; Riley, Adams & Nielsen, 1984; Ryan & Kuczkowsky, 1994). Ryan and Kuczkowsky (1994) argued that the IAS measures the awareness of oneself as a social object, and thus assesses public self-consciousness. The scale is reprinted in Appendix C.

The IAS consists of 12 potentially self-revealing situations. Participants choose among three alternatives to indicate their potential emotional or behavioural reaction to each situation. The items are given a score from 2 to 0 where higher scores signifies unwillingness to expose the transient or abiding self because of self-consciousness. The IAS has two subscales, the Abiding self and the Transient self subscales. The Abiding self items involve situations in which stable or deeper aspects of the self may be revealed. One example is: " If you were asked to get up in front of the class and talk a little bit about your hobby.... (I wouldn't be nervous at all, I would be a little bit nervous, I would be very nervous)". These items are

modified versions of those used by Simmons, Rosenberg & Rosenberg (1973) in their self-consciousness scale.

The Transient self subscale was created by the authors and includes six potentially embarrassing situations of a momentary sort. An example is: "Your class is supposed to have their picture taken, but you fell the day before and scraped your face. You would like to be in the picture but your cheek is read and swollen. Would you have your picture taken anyway, or stay out of the picture? (Get my picture taken even though I'd be embarrassed, Stay out of the picture, Get my picture taken and not worry about it.)"

Riley et al.(1984) tested the construct validity of the IAS with a sample of 251 early adolescents. Video cameras are known to induce self-consciousness in those who are being filmed, and in this study a video camera was recording some of the participants as they were filling in the IAS. This procedure increased self-consciousness as measured by the IAS. Elkind and Bowen (1979) reported test-retest correlations of .66 for the Transient self subscale, .62 for the Abiding self subscale, and .65 for the total IAS score. Schonert-Reichl (1994) reported internal consistency as measured by Cronbach's alpha of .50 for the Transient self subscale, .70 for the Abiding self subscale, and .66 for total IAS score. Overall, the IAS appears to have adequate validity and test-retest reliability.

Because some of the items on the scale were not suitable for a New Zealand context, some minor modifications had to be made. Item three referring to a basketball game was changed to a sporting event. No other modification to the scale as printed on the survey were made, however, a modification of item five was made verbally while the children were presented with the questions. Item five refers to a split in the jeans, and the children were asked to imagine having a corresponding split in their school uniform.

II.II RESULTS

The results are organised into two major sections. Section 1: "Weight concerns", presents an analysis of weight concerns in the sample. Age and gender differences in various aspects of weight concerns will be analysed using two way analyses of variance and chi-square analyses. To get an impression of the distribution of weight concerns in the sample, a frequency distribution for each alternative answer to all of the 5 questions on the Weight Concern measure will be computed. Finally, the number of children thought to be at risk of developing disordered eating will be calculated using Killen et al.'s (1994) cut-off point of 57 on the Weight Concern measure.

Section 2: "Predictor variables and weight concerns ", presents an analysis of the predictor variables and their relationship with weight concerns. Means for girls and boys on shyness, the IAS, fearfulness, and autonomic reactivity will be compared using a two way analysis of variance. The intercorrelations between the predictor variables will be computed using Pearson product moment correlation coefficients. The hypothesised relationships between weight concerns and the predictor variables will then be analysed. These relationships will first be examined for using Pearson Product Moment Correlation Coefficients. To assess the predictive value of shyness, self-consciousness, fearfulness, and autonomic reactivity, these variables, together with age and gender, will then be entered into a standard multiple regression analysis. In addition, separate regression analysis will be computed for each gender. Next the children will be devided into a fearful shy, a self-conscious shy, and a non-shy subgroup, and the groups will be compared with regards to weight concerns using a t-test. Finally, the group identified as at high risk of developing disordered eating according to the extent of their weight concerns will be compared with the group at low risk using t-tests.

Results were collapsed across ethnic groups because there were not sufficient numbers of non-European children to conduct a separate analysis. An alpha level of .05 was used for all statistical tests.

Weight concerns

Section one provides an exploration of weight concerns in the sample. In order to get an impression of the levels of weight concerns, and how these concerns varied according to age and gender, mean scores for all groups on the Weight Concern measure were computed. The mean scores are presented in Table 1.

Table 1 *Mean scores on the Weight concerns scale*

	11-year-olds		**12-year-olds**		**13-year-olds**		**All ages**	
Weight concerns	Mean	std.dev	Mean	std.dev	Mean	std.dev	Mean	Std.dev
Girls	39.6	(17.2)	49.3	(20.5)	51.6	(21)	46.3	(20)
Boys	34.8	(15.7)	33.3	(13.2)	32.6	(14.4)	33.7	(14.3)

In order to assess gender and age differences in weight concerns, a 2 (gender) by 3 (age) two way analysis of variance was computed. A main effect for gender was found, with girls scoring significantly higher than boys on the Weight Concern measure, $F(1, 171) = 22.56$, $p < .001$. No main effect for age emerged, but there was a marginally significant interaction effect for gender and age $F(2, 171) = 2.50$, $p < .1$. This interaction effect is displayed in Figure 1. Figure 1 shows that weight concerns increased with age for girls. There was no corresponding increase in weight concerns in boys.

To assess the effect of age and gender on fear of gaining weight, a 2 (gender) by 3 (age) two way analysis of variance was computed. A statistically significant main effect of gender was found on fear of gaining weight. Girls (M = 9.77, SD = 5.03) were more fearful of gaining 1 kg than were boys (M = 6.65, SD = 4.63), $F(1, 171) = 16.7$, $p < .001$. A significant effect of age was also found, $F(2, 171) = 4.25$, $p < .05$. Post-hoc testing using Tukey's Honestly Significant Difference Test revealed that 13 year olds (M = 11.43, SD = 5.07) were significantly more afraid of gaining weight than 11-year-olds (M = 7.90, SD = 4.25) and 12-year-olds (M = 10.46, SD = 5.24), whereas 11 and 12-year-olds did not differ significantly from each other in their fears of gaining weight. No significant interaction effects between age and gender was found, $F(2, 171) = .77$, $p = .46$.

To assess the effect of age and gender on the importance placed on weight compared to other things in life, a 2 (gender) by 3 (age) two way analysis of variance was computed. A significant main effect of gender was found on the importance of weight, with girls (M = 8.07, SD = 4.12) placing more importance on their body weight than boys (M = 6.83, SD = 3.51), $F(1, 171) = 6.76$, $p < .05$. No main effect of age emerged, $F(2, 171) = .84$, $p = .43$. There was a significant interaction effect between age and gender, $F(2, 171) = 4.79$, $p < .05$. The interaction effect is presented in Figure 2. Figure 2 shows that whereas the importance placed on body weight increased with age for girls, boys found their weight less important with increasing age. The graph also shows that the level of importance 11 year old girls placed on their weight is similar to that of boys.

To assess whether there were differences in the likelihood of having dieted for boys and girls at different ages, the question on the Weight Concern measure related to dieting was turned into a dichotomous variable representing those who had been dieting at some time versus those who had never dieted. Chi-square analyses were computed for dieting by gender and dieting by age. Girls were significantly more likely to have been dieting than boys, x^2 (1, N = 177) = 7.76, $p < .01$. There was no significant effect of age for the whole sample, x^2 (2, N = 177) = .76, $p = .68$. In order to assess whether dieting increased with age for one gender only, separate chi-squares were calculated for girls and boys. Dieting did not differ significantly with age for girls, x^2 (2, n = 106) = 1.28, $p = .53$, or for boys, x^2 (2, n = 71) = .25, $p = .88$.

Figure 1: **Weight concerns**

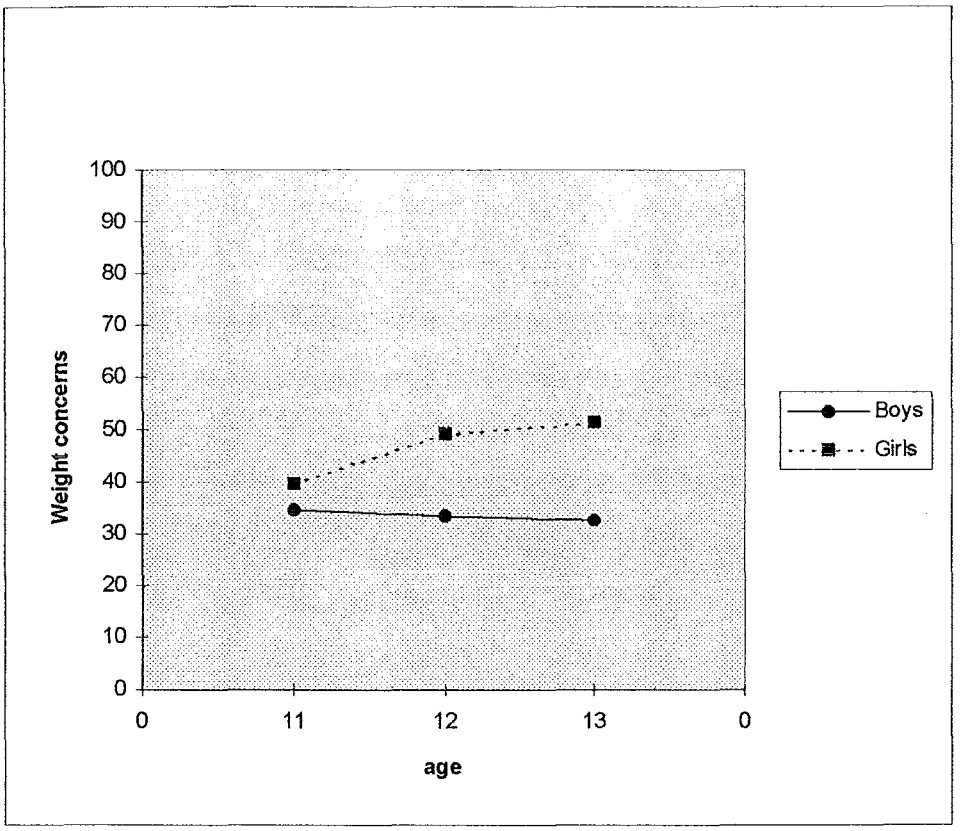
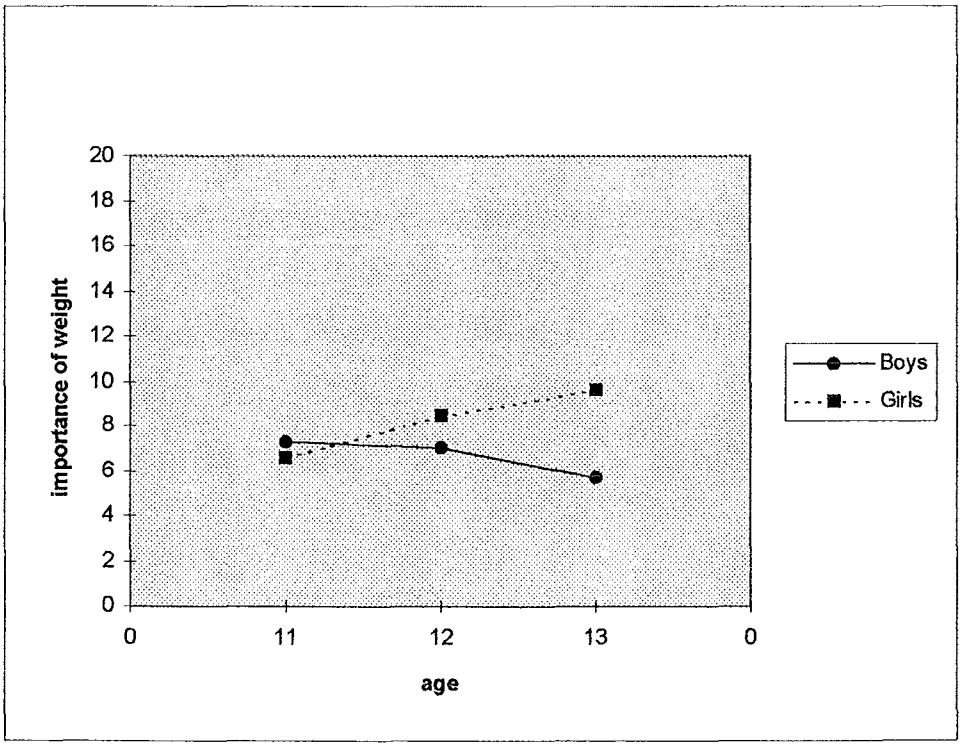


Figure 2 **Importance of weight**



In order to get an impression of the distribution of concerns about weight, frequencies of choosing each alternative answer on all 5 items of the Weight Concern measure were computed. The percentage of boys and girls in the different age groups choosing each alternative answer can be found in Appendix D. Some of the most important findings are reported in the following: Among girls, 20.8 % had been dieting at some time, compared to 5.6% of the boys. The prevalence of dieting for each age group is presented in Figure 3. As many as 20.7% of the girls were very afraid of, or terrified of gaining 1kg. The degree of fear of weight gain for girls at the different ages is illustrated in Figure 4. Figure 4 shows that the older girls were less likely to report no fear of gaining 1 kg. compared with 11-year-olds, and more likely to report being terrified of gaining weight. Among the girls, 28.4% reported feeling fat often or always, compared to 7% of the boys. The majority of both boys and girls did not see their weight as important compared to other things in their life, although this response was more commonly given by boys (73.2% of boys versus 55.7% of girls). At the other extreme, 12.2% of the girls perceived their weight as more important than most things in life, or the most important thing in their life. Thus although many girls reported little concerns about their weight, a substantial minority expressed serious concerns in many areas related to their weight, and also placed excessive importance on body weight compared to other things in their life.

Lastly, children at risk of developing disordered eating were identified. In their prospective study, Killen et al.(1994) found that a cut-off point of 57 on the Weight concern measure provided optimum sensitivity and specificity for detection of risk for development of subclinical eating disorders in 11-13 year old girls. When this criteria was applied to the present study, 25% of the girls scored within the "at risk" range. When analysed by age, 15.4% of the 11 year old girls, 30.8% of the 12 year old girls, and 32.1% of the 13 year old girls scored in the "at risk" range. To assess the statistical significance of the age differences in the proportion of girls identified as "at risk", a chi-square analysis was computed. The age groups did not differ significantly from each other, x^2 (2, n = 106) = 3.3, p = .19.
The predictive power of the Weight concern measure was only assessed for girls, so it can not be assumed that the measure has predictive validity for boys. When the same criteria for definition of risk were applied to boys in this sample, only three boys scored in the "at risk" range, making up 4.2% of the male population.

Figure 3 **Prevalence of dicting**

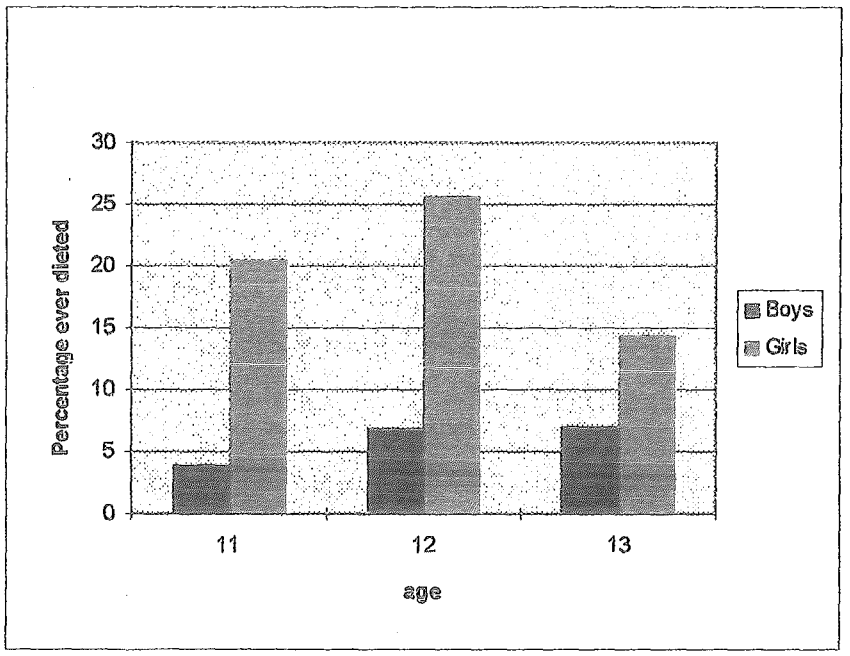
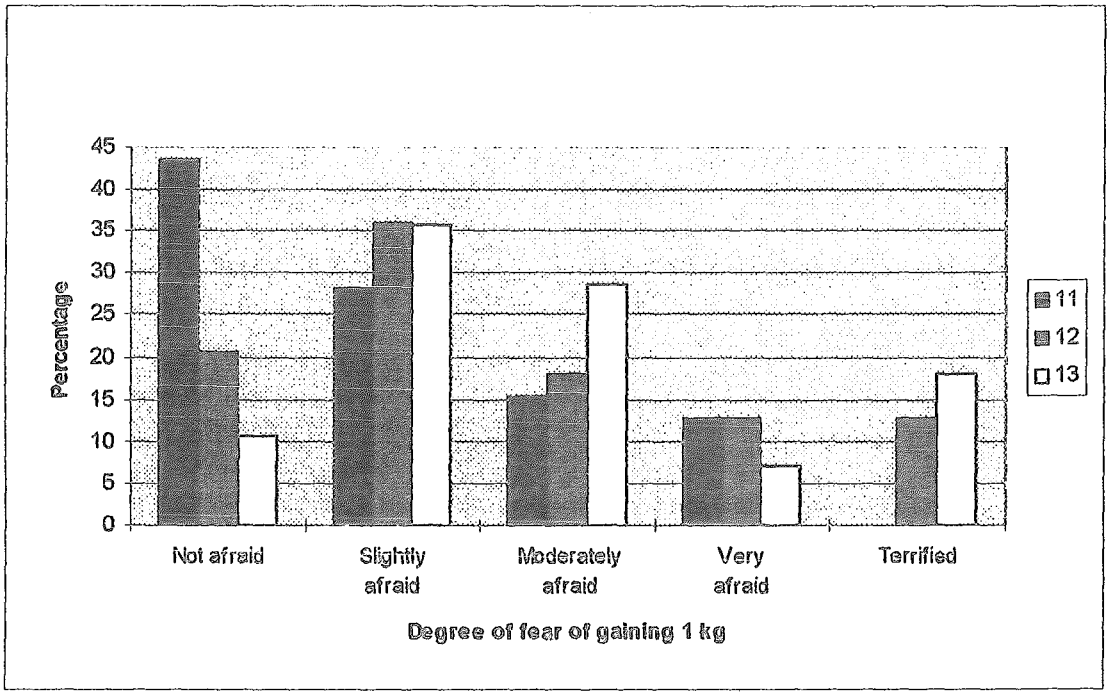


Figure 4 **Fear of weight gain in girls**



Predictor variables and weight concerns

Section 2 provides an analysis of the predictor variables, that is, shyness, self-consciousness, fearfulness, and autonomic reactivity, used in this study, and their relationship with weight concerns. Firstly, means and standard deviations on all predictor variables by age and gender were computed. Means and standard deviations are presented in table 2.

Table 2 *Means and standard deviations on predictor variables*

	11 year olds		**12 year olds**		**13 year olds**		**All ages**	
Shyness	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Girls	23.3	(5.3)	24.5	(6.1)	22.8	(5.6)	23.6	(5.7)
Boys	23.4	(5.8)	21.0	(5.9)	21.9	(5.4)	21.9^{+}	(5.8)
Fearfulness								
Girls	20.7	(5.9)	21.2	(5.4)	19.0	(4.9)	20.5	(5.5)
Boys	18.7	(4.7)	16.6	(4.8)	18.6	(5.9)	17.8**	(5.5)
Aut. reactivity								
Girls	16.5	(5.4)	18.7	(5.8)	17.4	(4.2)	17.6	(5.3)
Boys	16.2	(5.0)	15.1	(4.3)	17.4	(4.9)	16.0^{+}	(4.7)
IAS								
Girls	8.5	(3.5)	10.9	(4.0)	10.8	(5.1)	10.0	(4.2)
Boys	7.4	(3.3)	6.3	(3.4)	8.5	(4.7)	7.2***	(3.7)

$^{+}$ $p = .1$

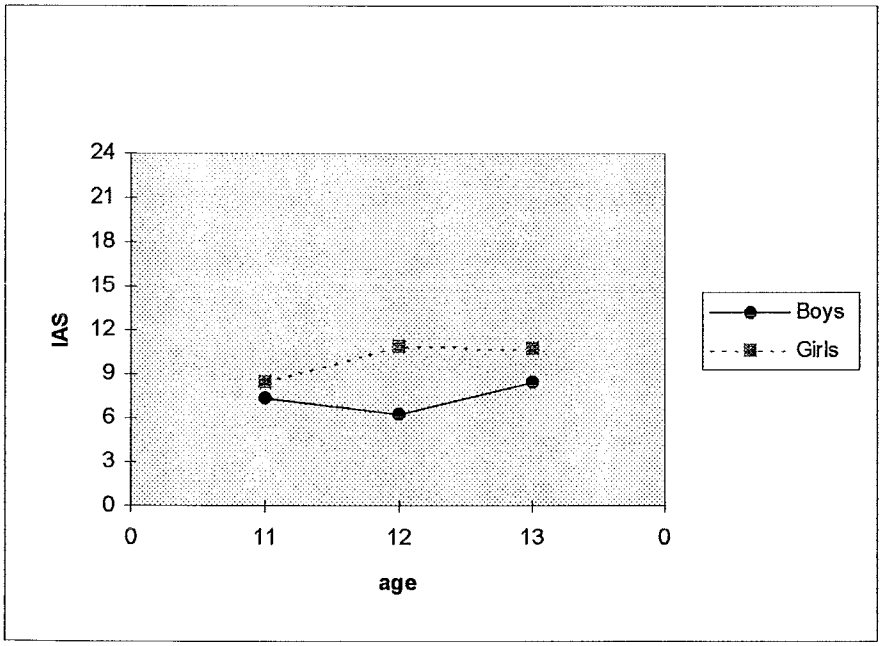
** $p < .01$

*** $p < .001$

Significance values are for the main effects of gender in a two way analysis of variance.

To assess whether shyness, fearfulness, reactivity, and self-consciousness (IAS) differed significantly by age and gender, 2 (gender) by 3 (age) two way analyses of variance were computed for each of these independent variables. There was a trend for girls to score higher on shyness than boys $F(1, 175) = 3.44$, $p < .1$. No statistically significant effects of age or interaction effects between age and gender were found. When age and gender differences in fearfulness were examined, the two way analysis of variance revealed only a main effect of gender. Girls reported significantly more fearfulness than boys $F(1, 171) = 8.01$. $p < .01$. There was a marginally significant trend for girls to score higher on autonomic reactivity than boys $F(1, 171) = 2.87$, $p < .1$. Autonomic reactivity did not differ significantly with age, and there was no interaction effect for age and gender. There was a significant main effect of gender on self-consciousness. Girls scored significantly higher on self-consciousness than boys $F(1, 171) = 18.27$, $p < .001$. There was no main effect of age on self-consciousness, but there was a significant interaction effect between age and gender $F(2, 171) = 3.17$, $p < .05$. The interaction is displayed in Figure 5. Figure 5 shows that self-consciousness increased between age 11 and age 12 for girls, whereas for boys, self-consciousness decreased somewhat at age 12, and increased again at age 13.

Figure 5 **IAS: Self-consciousness**



To assess the relationship between the predictor variables, intercorrelations were computed for shyness, IAS, fearfulness, and autonomic reactivity. The correlations and significance values using Pearson product moment correlation coefficients, are presented in Table 3.

Table 3: *Intercorrelations between predictor variables*

	Shyness	**IAS**	**Fearfulness**	**Aut. reactivity**
Shyness	--			
IAS	.57 ***	--		
Fearfulness	.44 ***	.47 ***	--	
Aut. reactivity	.41 ***	.38 **	.50 ***	--

** $p<.01$ Pearson product moment correlation coefficients

*** $p<.001$ Two-tailed

Table 3 shows that all the predictor variables correlated positively and significantly with each other. The IAS and shyness correlated relatively highly at $r = .57$, and the IAS also correlated moderately with fearfulness, $r = .47$, and autonomic reactivity, $r = .38$.

Next the relationship between weight concerns and the predictor variables were analysed. The literature reviewed suggested that risk factors may vary according to age and gender. Correlation coefficients were therefore computed both for the sample as a whole, and separately for each gender at each age. The correlations coefficients are shown in Table 4:

Table 4 *Correlations between predictor variables and weight concerns*

	11-year olds[1]	**12-year olds**[2]	**13-year olds**[3]	**All ages**	**Whole sample**
Shyness					
Girls	-.29^{+}	.08	.11	-.01	.02
Boys	.08	-.24	-.16	-.08	
IAS					
Girls	-.09	.06	.32	.17^{+}	.20*
Boys	-.03	.00	-.14	-.04	
Fearfulness					
Girls	.08	.07	.45 *	.15	.18*
Boys	-.02	-.04	.23	.03	
Aut. Reactivity					
Girls	-.22	.24	.26	.11	.16*
Boys	-.04	.33^{+}	.21	.14	

$^{+}$ $p<.1$ Pearson product-moment correlation coefficients

* $p<.05$ Two-tailed

[1] Girls: n = 39, boys: n = 26
[2] Girls: n = 39, boys: n = 30
[3] Girls: n = 28, boys: n = 15

Hypothesis 1 predicted that shy children would report more concerns about their weight than children who were less shy. Table 4 shows that shyness was not significantly correlated with weight concerns for the whole sample or either gender. Eleven year old girls scoring higher on shyness showed a trend towards reporting less concerns about their weight, $r = -.29$, $p < .1$. This trend was in the opposite direction from that predicted.

Hypothesis 2 predicted that self-consciousness would be related to weight concerns. As seen in Table 4, the IAS showed a significant positive correlation with weight concerns for the whole sample $r = .20$, $p < .05$. When analysed for both genders separately, the IAS was not correlated with weight concerns for boys. The girls showed a marginally significant trend for higher self-consciousness to be associated with more weight concerns, $r = .17$, $p < .1$. There was a relatively sharp devide between age 12 and age 13 for girls, with the correlation between self-consciousness and weight concerns increasing from near zero at age 12 to .32 for age 13. Hypothesis 2 may thus be more accurate for older girls.

As seen in Table 4, the two measures of temperament showed some relationship to weight concerns. Both fearfulness and autonomic reactivity correlated significantly with weight concerns for the whole sample ($r = .18$, and $r = .16$ respectively, $p < .05$). When analysed by age and gender, fearfulness was not significantly related to weight concerns for girls overall, but a significant correlation was found between fearfulness and weight concerns at age 13, $r = .45$, $p < .05$. As with self-consciousness, the relationship between fearfulness and weight concerns increased markedly from age 12 to age 13 for girls. Autonomic reactivity was not significantly correlated with weight concerns for girls or boys analysed separately, but there was a marginally significant trend for 12 year old boys who reported higher autonomic reactivity to also report more concerns about their weight, $r = .33$. $p < .1$.

Overall, there seemed to be a trend for girls towards increasing positive correlations between weight concerns and the predictor variables with age. This trend confirm the need to look at the relationship between weight concerns and other variables at different stages in development. For boys, most of the predictor variables seemed unrelated to weight concerns, with the exception of autonomic reactivity.

To assess whether shyness, self-consciousness, fearfulness, and autonomic reactivity could predict weight concerns, these variables were entered into a standard multiple regression analysis, together with gender and age. The overall regression was statistically significant, $F(6, 169) = 5.36$, $p < .001$, $R = .40$. All of the variables together predicted 16% of the variance in weight concerns. Gender was the only variable that contributed significantly to the prediction, $t = 3.73$, $p < .001$. The partial correlation for gender was squared in order to find the amount of unique variance in weight concerns attributable to gender. Gender contributed 6.9% of the unique variance. The remaining 9.1% of the variance was jointly contributed to by all variables.

Separate regression analysis were run for each gender, entering age, shyness, IAS, fearfulness, and autonomic reactivity respectively. The regression analysis was not statistically significant for boys, $F(5, 64) = .66$, $p = .66$. In contrast, the regression analysis was significant for girls, $F(5, 100) = 2.47$, $p < .05$, $R = .33$. All the variables together predicted 11% of the variance in weight concerns for girls. Age was the only significant predictor of weight concerns $t(5, 100) = 2.27$, $p < .05$. The partial correlation for age was squared in order to find the unique variance in weight concerns predicted by age. Age contributed 4.6% of unique variance, whereas the remaining 6.4% of the variance in weight concerns was jointly contributed to by all variables.

Since the association between weight concerns and a number of the independent variables appeared to increase from age 12, a multiple regression analysis was performed for 12 and 13 year olds only, in order to test whether the predictor variables would be better predictors of weight concerns in this age group. The overall regression was significant $F(6, 104) = 5.75$, $p < .001$, $R = .50$. All the variables together predicted 24.9% of the variance in weight concerns. Thus the variables were somewhat more successful in predicting weight concerns at age 12 and 13, compared to when children at age 11 were included in the regression. Only two variables contributed significantly to the prediction; gender $t(6, 104) = 3.93$, $p <. 001$, and autonomic reactivity $t(6, 104) = 2.11$, $p < .05$. Gender contributed 11.2% of the unique variance in weight concerns, and autonomic reactivity contributed 3.2% of unique variance. The other 10.5% of the variance was contributed to jointly by all the variables.

Hypothesis 3 predicted that self-conscious shy children would be more concerned about their weight than fearful shy children. To address this hypothesis the children were devided into a fearful shy, a self-conscious shy, and a not shy subgroup. Participants were assigned to shyness groups according to the procedure used by Bruch et al. (1986), and recommended by Buss (1986), although this study used different instruments to assess the relevant constructs. Participants who rated themselves as currently shy (answered mostly true or very true to the statement "I am shy"), scored one-half of a standard deviation above the mean on shyness and fearfulness, and who scored one half of a standard deviation below the mean on public self-consciousness (IAS), were classified as fearful shy. Participants who rated themselves as currently shy, scored one-half standard deviation above the mean on shyness and public self-consciousness (IAS), and who scored one-half standard deviation below the mean of fearfulness, were classified as self-conscious shy. Participants who scored low on both shyness, fearfulness and public self-consciousness were classified as non shy. 3 children could be classified as self-conscious shy according to this procedure, and one child was classified as fearful shy. Due to these low numbers, shyness groups could not be compared with regards to weight concerns.

It is conceivable that a relationship between weight concerns and the predictor variables would only be present in those who are excessively concerned about their weight. To assess this possibility, the girls identified as falling within the high and low risk group according to their scores on the Weight Concerns scale were compared on shyness, self-consciousness, fearfulness, and autonomic reactivity. Means and standard deviations for both groups are presented in Table 5.

Table 5 Comparison of means on predictor variables for "high risk" and "low risk" girls

	Shyness	IAS	Fearfulness	Aut. reactivity
Low risk (n = 76)	23.67 (5.43)	9.53 (3.77)	19.74 (5.42)	17.16 (5.02)
High risk (n = 30)	23.43 (6.33)	11.17 (5.16)	22.27 (5.27)	18.77 (5.88)

(Standard deviations in parenthesis)

From Table 5 it can be seen that the "high risk" group scored higher on self-consciousness, fearfulness, and autonomic reactivity compared with the "low risk" group. An independent samples t-test of the significance of these differences found that only fearfulness was significantly higher in the "high risk" group compared with the "low risk" group, $t(1, 104) = 2.18$, $p < .05$.

II.III DISCUSSION

The results in the present investigation confirm the findings from other studies that children as young as 11 and 13 years old experience concerns about their weight, and that girls are more likely than boys to report such concerns. Gender differences in weight concerns became apparent from age 12, when weight concerns increased markedly in girls, but not in boys. The hypothesis that increased shyness in children would be associated with more weight concerns was not supported. No significant correlation between shyness and weight concerns was found for girls or boys in this sample, and shyness did not significantly predict weight concerns. Similarly, girls who scored in the "at risk" range on the measure of weight concerns did not differ significantly from the other girls in degree of shyness reported. The second hypothesis predicted that high self-consciousness would be associated with more concerns about weight. There was a marginally significant trend for higher self-consciousness to be associated with more weight concerns in girls, but self-consciousness was not a significant predictor of weight concerns in the regression analysis. Self-consciousness and weight concerns were more positively associated for 13-year-olds than 11 and 12-year-olds, raising the possibility that the hypothesised relationship between weight concerns and self-consciousness might become stronger with age. There was no evidence of fearful and self-conscious shy subgroups in this sample, and the hypothesis that self-conscious shy girls would be more concerned about their weight than the fearful shy could thus not be tested.

The lack of relationship between weight concerns and shyness could be interpreted in several ways. Firstly, there may be no relationship between weight concerns and shyness in non-clinical populations. The shyness found in individuals with eating disorders may be a consequence of the disorder rather than a cause. Secondly, general concerns about weight may be relatively common and not associated with psychopathology unless the weight concerns become pathological. Thirdly, shyness may only be associated with weight concerns in a particular subgroup of the shy, such as the self-conscious shy. Lastly, shyness as conceptualised in this study may not have accurately captured the type of social anxiety associated with weight concerns and eating disorders.

The lack of a significant relationship between shyness and weight concerns found in this study is consistent with the non-significant relationship between social anxiety and weight concerns or dietary restraint found by Klesges et al. (1984), and Striegel-Moore et al. (1993). In contrast, the results are inconsistent with Hee Kwon's (1992) and Blanchard et al.'s (1983) reports of a weak but significant positive relationship between social anxiety and weight concerns. The 11-year-old girls in this study showed a marginally significant trend towards a negative relationship between shyness and weight concerns, that is, the relationship was the opposite of that expected with less shyness associated with more concerns about weight. This trend towards a negative relationship between social anxiety and weight concerns is consistent with Hamilton et al.'s (1992) study of adult females, and Rosen et al.'s (1987) study of high school students which both found that less social anxiety predicted more dietary restraint. Hamilton et al. speculated that social anxiety may be related to a general tendency to experience anxiety, and that the anxiety in turn suppresses appetite, obviating the need to diet. The argument that a general tendency towards fearfulness would reduce weight concerns was not supported in this study, as fearfulness was significantly higher in girls who scored in the "at risk" range on the Weight Concern measure compared with girls who fell in the "low risk" group.

The lack of a consistent relationship between social anxiety and weight concerns in the studies reviewed as well as the present study contrasts with the more consistent relationship between social anxiety and body dissatisfaction. Since body satisfaction in women is positively associated with satisfaction with weight (Davis, Durnin, Dionne, & Gurevich, 1994), several researchers have hypothesised that social anxiety might also be related to weight concerns. Few have attempted to explain why research has not confirmed this hypothesis. Despite being dissatisfied with their body, there are certain characteristics of shy females that could reduce their risk of weight concerns. As reported in the review, heterosocial involvement and sexual contact, behaviours that are likely to be delayed and more infrequent in the shy (Zimbardo, 1981), have been found to spur weight concerns in adolescents. Although speculative, it is conceivable that because shy adolescent and young adult females are less involved in dating and tend to withdraw from social interactions, they may be less subjected to the pressures for thinness and preoccupation with dieting that may arise among females who are concerned with attracting males. Body dissatisfaction in the shy may be part of the more general tendency

towards self-derogation, and may not necessarily become directed at body weight in particular. These interpretations however, do not explain why shyness has been found to be related to eating disorders. Despite not being associated with the more commonly reported moderate concerns about weight, shyness may still be related to more pathological forms of weight concerns.

Concerns about weight in females may be relatively normative and vary largely according to the degree to which an individual's body weight deviates from the thin ideal, and social anxiety may only be associated with weight concerns in those who already meet the ideal and still experience concerns, or those who also employ extreme weight loss methods or show symptoms of disturbed eating. Wertheim et al. (1992) studied high school students and found that weight loss behaviour was mostly guided by a desire to be thinner by those overweight, and was relatively independent of emotional and family factors measured by the study. However, girls who dieted although they were already thin, or used extreme dieting methods on a regular basis reported greater psychological distress. These possibilities could not be assessed in the present study as no measures of actual body weight or disturbed eating were included.

The present study intended to assess the relationship between weight concerns in two types of shyness, fearful and self-conscious shyness. From the literature reviewed it appears that females with eating disorders experience high levels of public self-consciousness, need for approval, and fear of negative evaluation, characteristic of Buss' category of self-conscious shyness, and Bulik (1995) has suggested that self-conscious shyness may be the type of shyness most closely associated with eating disorders. The present study failed to identify a fearful and a self-conscious type of shyness as defined by Buss, and could thus not assess the relationship between self-conscious shyness and weight concerns. A combination of both self-consciousness and fearfulness was more typical of the shy children in this sample.

The inability of this study to differentiate between fearful and self-conscious shy children could either reflect the absence of a separate fearful and self-conscious type of shyness in this age group, or it could be due to a failure of the measurement instruments used to separate these two shyness groups. If Buss' theory does not accurately describe the nature of shyness in

pre-adolescents, then that would have implications for using it as a basis for formulating theories of the relationship between shyness, weight concerns, and eating disorders. Although a popularly cited theory, Buss' theory has only been subjected to limited empirical testing, and more tests of the theory are needed. Two studies have supported Buss' distinction between a self-conscious and a fearful type of shyness, both conducted with college age participants (Schmidt & Robinson, 1992; Bruch et al., 1986). These two studies identified 17-18% of college students as either fearful shy or self-conscious shy, as opposed to the 2.3% falling into either catagory in this study. Both studies used different instruments than the present study in order to identify the two types of shyness. The instruments given to the college sample used a language that seemed too complex for children, and alternative measures of the same constructs were therefore chosen for the present study. However, although superficially measuring the same constructs these measures may have differed in important ways. Both of the studies with college participants used the public self-consciousness subscale from the SCS to identify self-consciousness. Bruch et al. (1986) also used part of the IAS to gain retrospective reports of self-consciousness in Junior High school, and in addition created four situations similar to those described in the IAS as another measure of self-consciousness in College. The two shyness groups did not differ in their retrospective reports of self-consciousness in Junior High School as measured by the IAS. And despite having been classified as fearful shy partly because of their low scores on public self-consciousness, the fearful shy reported significantly *more* self-consciousness than the self-conscious shy in college as measured by the scale describing situations similar to those in the IAS. Bruch et al. did not discuss the difference in the self-consciousness reported on the public self-consciousness scale as compared with the other measure of self-consciousness in college. The Public self-consciousness scale apparently measured something different from the scales that assess self-consciousness in particular situations. Perhaps situations with a potential to elicit embarrassment in many people as those described in the IAS, provoke equal levels of self-consciousness in both fearful and self-conscious shy individuals. The public self-consciousness scale in contrast, may measure a tendency to be habitually self-conscious independent of the situation or in a much wider range of situations.

Although the IAS is widely used as a measure of self-consciousness is adolescence, in the literature reviewed, only one study was found that assessed the relationship between the IAS

and the Public self-consciousness subscale of the SCS. Ryan and Kuczkowski reported that the IAS showed a significant but modest correlation with the Public self-consciousness scale in adolescents. But the IAS also showed a relationship of the same magnitude to the social anxiety subscale of the SCS. The present study also provided information suggesting that the IAS may be confounding self-consciousness and social anxiety. The IAS correlated .57 with shyness, a much stronger association than the .26 correlation that has been reported between the Cheek and Buss shyness scale and the Public self-consciousness scale (Cheek and Buss, 1981). The IAS also correlated highly with fearfulness. Some of the items in the IAS are similar to items that Fenigstein et al. (1975) used as part of their scale for assessing social anxiety, such as speaking in front of a group, and becoming nervous when someone is watching you work. If the IAS as a measure of self-consciousness is confounded by social anxiety, then that could be a reason why both fearful and self-conscious shy might score high on the IAS. Due to these problems with the IAS, this study may not have provided a good measure of public self-consciousness as conceptualized by Buss, affecting the ability of this study to identify a self-conscious shy group, and the possibility of assessing the relationship between weight concerns and self-conscious shyness in particular. Future studies of the relationship between self-conscious shyness and weight concerns in children might benefit from the development of an equivalent to the Fenigstein et al. (1975) Public self-consciousness scale for children.

Despite difficulties with IAS as a pure measure of self-consciousness, the mixture of social anxiety and self-consciousness assessed by the IAS showed a more positive relationship with weight concerns for girls than did shyness. An alternative explanation for the non-significant relationship between weight concerns and shyness in this study may be that the measure of shyness did not accurately capture the type of social anxiety that is related to weight concerns and experienced by individuals with an eating disorder. Buss' (1980) concept of shyness includes both behavioural inhibition and internal distress. In contrast to the large body of literature examining internal distress resulting from public self-consciousness and fear of negative evaluation, very few studies have assessed behavioural inhibition in the context of eating disorders. Becker et al. (1987) have proposed that previous reports of greater social anxiety in women with BN may stem from fears of rejection more than from fears of incompetent social performance. In their study, female students with BN reported more fear of

rejection than other female students, but they did not perceive themselves as any more socially inhibited, socially incompetent, or afraid to participate in relationships with the opposite sex, than did the women with no eating disorder. Segal and Figley (1985) have suggested that women with BN feel anxious in social situations and fear interpersonal evaluation and rejection, but act outgoing rather than inhibited in social interaction in order to gain approval. Pilkonis (1977) has labelled this combination of internal anxiety and outgoing behaviour "private shyness". If women with eating disorders experience tension and discomfort in social situations due to fear of negative evaluation, but little behavioural inhibition, than the lack of relationship between the measure of shyness and weight concerns in this study may be due to the emphasis on behavioural inhibition in the shyness measure used.

The present study did not include any specific instruments to measure fear of negative evaluation or need for approval, but the IAS does include the following two questions that refer explicitly to concerns about how one is being evaluated by others.

- One young person said, "When I am with people I get nervous because I worry about how much they like me". (Alternative answers indicate how often this feeling is present).
- If you went to a party where you did not know most of the kids, would you wonder what they were thinking about you?" (Alternative answers indicate how much they would wonder about this).

To ascertain whether fear of negative evaluation could be related to weight concerns in this sample despite the absence of a relationship between weight concern and the shyness measure used, a post hoc analysis was performed. The scores on the above items from the IAS were added together and correlated with weight concerns. These items correlated significantly with weight concerns for girls ($r = .37$, $p < .001$), but were unrelated with weight concerns for boys. A multiple regression analysis for females only was conducted, where the two items from the IAS were entered together with all the other independent variables including age. Results from the regression analysis can be found in Appendix D. High scores on the two items from the IAS predicted greater weight concerns and contributed 10.7% of the unique variance in weight concerns for girls ($p < .001$).

Since this study was not designed to address fear of negative evaluation specifically, this post-hoc analysis must be treated with caution. However, it does suggest that further studies

of risk factors for weight concerns and disordered eating in children and adolescents would benefit from including instruments designed to measure fear of negative evaluation. The results of this study also suggest that future studies may want to examine whether Buss's model of self-conscious shyness, or Pilkonis' model of private shyness come closer to describing the social anxiety experienced by females with eating disorders. A more comprehensive understanding of the type of social anxiety experienced could be obtained by assessing behavioural, cognitive, affective, and physiological components of social anxiety and shyness.

Some association between temperamental factors and weight concerns was found in this sample. A significant relationship was found between higher levels of fearfulness and increased weight concerns in 13 year old girls, and girls who scored in the "at risk" range on the Weight Concern measure reported significantly more fearfulness than the "low risk" group. High autonomic reactivity was a significant predictor of weight concerns in 12 and 13-year-olds. Several researchers have suggested that the relationship between eating disorders and a wide range of anxiety disorders, including social anxiety, may be mediated by a genetic or temperamental vulnerability that increases the risk of developing both eating disorders and anxiety disorders (Bulik, 1995; Crisp, Hall, & Holland, 1985; Walters & Kendler, 1995). These findings suggest the possibility that high autonomic reactivity and fearfulness may be part of a temperamental vulnerability that increases the risk of weight concerns. Fearfulness has also been implicated in other studies which have found increased trait anxiety in adolescents with poor body image and disordered eating behaviour and attitudes (Abrams, Allen, & Gray, 1992; Canals, Carbajo, Fernandez, Marti-Henneberg & Domenech, 1996; Carter & Duncan, 1984; Dolan, Lacey & Evans, 1990; Fisher et al. 1994; Wright 1989), and in the review of risk factors for eating disorders, women with AN or BN were described as anxious, obsessional and ruminative. A case study reported by Chiodo (1987) suggested a possible relationship between general fearfulness and binge eating, and fear of negative evaluation and strict dietary control. The women described in the case study appeared to binge eat as a means of coping with feelings of anxiety and emotional distress, and struggled to maintain strict dietary control and a thin body shape in order to avoid negative evaluation, criticism, and social rejection.

It should be noted that although the measures of fearfulness and autonomic reactivity were presented as measures of temperament, these characteristics may result from negative life experiences. Childhood sexual abuse, one of the risk factors associated with weight concerns and eating disorders reviewed previously, is also associated with increased fearfulness and anxiety, as well as hyper-arousal (Kendall-Tackett, Williams, & Finkelhor, 1993). Furthermore, the application of attachment theory to women with eating disorders has lead to arguments that a general tendency toward fearfulness in these women, as well as particular concerns about negative evaluation and rejection in social relationships, stems from insecure attachment.

The review suggested that the relationship between psychological factors and weight concerns may change with age. The present study found that a number of the predictor variables appeared to become more positively related to weight concerns with increasing age in girls. The correlation between weight concerns and the IAS and fearfulness changed rather abruptly between age 12 and 13 from near zero correlations to moderate positive correlations. The relationship between weight concerns and autonomic reactivity showed a similar trend, changing from a negative correlation at age 11 to a positive correlation at age 12. The increasing positive correlations emerged after girls experienced a general increase in weight concerns around age 12. These results are consistent with a number of other studies that have found that a positive relationship between weight concerns and personality and psychopathology emerge around age 13 to 14 for girls (Attie et al., 1989; Richards et al., 1990; Gralen et al., 1990). In contrast, concrete events associated with pubertal development predicts weight concerns, dieting and disturbed eating in 6th and 8th grade, but not in older age groups (Gralen et al., 1990).

One reason for the increasing positive association between weight concerns and personality variables with age could be that personality factors interact with the developmental changes associated with puberty, such as increased body fat, new social roles, and a new focus on attractiveness and sexuality, so that certain personality traits make it more difficult to adjust to these changes. For example, for the self-conscious person who is more dependent on approval from others and more fearful of being evaluated negatively, the weight gain associated with puberty could elicit fears of rejection because of perceived deviations from the

ideal and the negative stereotypes associated with obesity. Alternatively, weight concerns and dieting arising around puberty may increase psychological distress, as was found in a longitudinal study by Rosen, Tacy and Howell (1990). Or a third variable may increase both weight concerns and psychological distress. For example, females who gain more weight than others during puberty may become both more self-conscious and more concerned about their weight. Weight gain may also result in experiences of being teased, and teasing could result in weight concerns, low self-esteem and fear of rejection. Future studies may want to include measures of relevant developmental changes, such as pubertal status, rate of weight gain, changes in family interaction, heterosocial activity, and peer relationships, in order to test the hypothesised interactions between psychological variables and pubertal development more directly. Because of the small number of children in each age group in this study, and the limited age span, conclusions about developmental changes can not be drawn. Future studies might benefit from obtaining larger samples spanning from childhood to adolescence in order to identify whether such a developmental pattern is present.

The present study also aimed to investigate the prevalence and nature of weight concerns in New Zealand children. Using Killen's (1994) criteria for identifying girls at risk of developing disordered eating from the extent of their concerns about weight, 25% of the girls scored in the "at risk" range. This is slightly more than the 19% of 11-13 year old girls found to be "at risk" in Killen et al.'s (1994) sample. Thus it appears that the New Zealand children in this study show weight concerns comparable to those found among children in the United States. The girls in this study showed an increase in weight concerns at age 12. A similar increase in weight concerns at age 12 to 13 for girls is commonly reported in the literature (Richards et al. 1990). Girls in this study placed increasing importance on their weight with age compared to other things in their life, and also became more fearful of gaining weight. It is of concern that one in five girls were either very afraid of or terrified of gaining a very small amount of weight at a time in development when weight gain is important for pubertal development. According to the NIMH (1995) report on prevention, interventions must occur at a time in development when risk factors become manifest, but not after these risk factors have affected psychopathology to the extent where the disorder has developed. The increase in weight concerns at age 12 suggests that this might be an ideal age for prevention efforts targeted at reducing this particular risk factor for eating disorders.

In accordance with findings from other studies, girls were more likely to have been on a diet than boys, with 20.8 % of the girls, and 5.6% of the boys reporting that they had been dieting at some time. Despite an increase in weight concerns with age for girls, there was no significant difference in the prevalence of dieting for the different age groups. Perhaps young girls are more influenced by dieting patterns of others around them, and diet without being particularly concerned about their weight. In accordance with this speculation, Hill, Weaver, and Blundell (1990) found a strong relationship between dietary restraint in 10 year old girls and their mothers. Rates of dieting in this age group were similar to those found in two other New Zealand studies (Bagby, 1993; Mason, 1995), and to those found in a study of same aged children in Cincinnati (Maloney et al., 1989). In contrast, dieting among New Zealand girls was much less common than the 53% reported by Koff et al.'s (1991) sample of 11-12 year old girls in Boston. The variations in the prevalence of dieting in different areas stresses the importance of assessing local differences in the "dieting culture" before planning prevention programs.

Overall, it appears that a subgroup of 11 to 13-year-old girls place excessive importance on their weight and worry considerably about being or becoming fat. These children may be at risk of developing eating disorders, and efforts aimed at reducing these concerns thus seem warranted. As many as 1 in 4 girls in this study expressed a degree of weight concerns that put them in the "at risk" range on the Weight concern measure, and caution must be taken so as not to pathologize these girls because of their weight concerns. Society puts a lot of pressure on girls to be attractive, and attractiveness in the modern Western society almost necessitates thinness. Children adopt negative stereotypes of fat people, and a positive perception of one's self as well as acceptability among peers may depend on the children not becoming obese. A certain degree of weight concerns, particularly in response to weight gain can thus be seen as an adaptive reaction to societal pressures. In order to detect abnormal weight concerns it may be necessary to include measures of the degree to which children who are concerned about their weight deviate from an "ideal weight" and the frequency and severity of weight loss strategies employed.

Scanners Note: there is no p78 in the original thesis.

Public self-consciousness scale. Further research is also needed on the validity and usefulness of the distinction between fearful and self-conscious shyness in children. It may also be that the high level of specificity in Buss' theory is not appropriate yet in the relatively unexplored area of the relationship between social anxiety and weight concerns in children. Perhaps more exploratory research using qualitative methods could provide a more holistic understanding of children's concerns about their weight and how it may relate to certain aspects of social anxiety. The complexity of the changing relationships between weight concerns and psychological factors across development also justifies the use of qualitative methods in order to get a better understanding of these interactions. Prevention programs need to be designed not only with individual risk factors in mind, but with an understanding of the context of young girls, the pressures they are subjected to, and the challenges they meet as they move into puberty and through adolescence.

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Appendix A: Information to parents and consent form

UNIVERSITY OF CANTERBURY
DEPARTMENT OF PSYCHOLOGY

INFORMATION

Your child has been invited to participate as a subject in the research project **"Social Anxiety and Body Image".**

The aim of the project is to investigate the relationship between social anxiety and concerns with physical appearance and dieting in children. Through becoming more aware of factors influencing body-dissatisfaction in children, we may become better equipped to prevent related problems, such as eating disorders.

Your child's involvement in this project will be to fill in some questionnaires asking about the degree to which they feel shy and anxious, how they feel about their body, and whether they have been dieting. Participation in the project is entirely voluntary.

For some children, thinking about some of their fears and dissatisfaction with their body while filling in the questionnaires, may cause some distress. They will be assured that they can discontinue at any time should they wish to do so. An assistant clinical psychologist will be present and the children will be encouraged to talk to her about any concerns either in class or individually. Questionnaires and class-discussions will be completed in approximately one hour. Children who do not wish to participate will be provided with an alternative activity by the teacher.

The result of the project may be published, but you may be assured of the complete confidentiality of data gathered in this investigation: the identity of participants will not be made public. To ensure confidentiality, your child will be assigned an ID number, which will be used on the questionnaire instead of names. A record of names and ID numbers will be kept securely locked up. No records of names will be kept with the questionnaires.

The project is being carried out under the direction of Eva Jacobsen, who can be contacted at ph.3375 330, and Dr. Cynthia Bulik, ph.3642 169. They will be pleased to discuss any concerns you may have about your child's participation in the project.

A follow-up to this study may be conducted in a couple of years time. You will be asked for your consent to such a study at that time. Consenting to this study does not mean consenting to a potential follow-up study.

The project has been reviewed and approved by the University of Canterbury Human Ethics Committee.

CONSENT FORM

PROJECT: SOCIAL ANXIETY AND BODY IMAGE

I have read and understood the description of the above named project. On this basis, I agree to let my child participate as a subject in the project, and I consent to publication of the results with the understanding that anonymity will be preserved. I understand also that my child may at any time withdraw from the project, including withdrawing any information he/she has provided.

Signed..... Date.....

APPENDIX B: *Information to children and consent form*

INFORMATION

You are invited to take part in a research study.

We are asking children to tell us how they feel about some things that children sometimes worry about. We also ask how they feel about their body, and if they have been on a diet. We do this to learn more about children, and how adults can help them with their worries.

You can choose if you want to participate or not.
If you decide to participate, we will give you questions on a piece of paper, and ask you to tick the answer that fits best for you. We will read all the questions to you, and we will explain the answers that you can chose from.
You should not put your name on the paper, so that the answers you give will be secret. No one, including your teacher, parents, and friends, will be told what you answered.

If you do not want to take part in the study, your teacher will give you something else to do.

CONSENT

If I put my name on the dotted line, it means I want to take part in the study. I can change my mind if I want to and stop filling in answers to questions at any time.

Name:.....

APPENDIX C: Measures

The Weight Concerns Scale

1. How much more or less do you feel you worry about your weight and body shape than other girls/boys your age?
____ I worry a lot less than other girls/boys.
____ I worry a little less than other girls/boys.
____ I worry about the same as other girls/boys.
____ I worry a little more than other girls/boys.
____ I worry a lot more than other girls/boys.

2. How afraid are you of gaining 1 kg (or 2.5 lbs)?
____ Not afraid of gaining.
____ Slightly afraid of gaining.
____ Moderately afraid of gaining.
____ Very afraid of gaining.
____ Terrified of gaining.

3. When was the last time you went on a diet?
____ I've never been on a diet.
____ I was on a diet a year ago.
____ I was on a diet about 6 months ago.
____ I was on a diet about 3 months ago.
____ I was on a diet about 1 month ago.
____ I am now on a diet.

4. Compared to other things in your life, how important is your weight to you?
____ My weight is not important compared to other things in my life.
____ My weight is a little more important than some other things.
____ My weight is more important than most, but not all, things in my life.
____ My weight is the most important thing in my life.

5. Do you ever feel fat?
____ Never
____ Rarely
____ Sometimes
____ Often
____ Always

The Early Adolescent Temperament Questionnaire (EATQ):

Please circle the answer which best describes how true each statement is for you.
There are no best answers. People are very different in the way they feel about these questions. Please circle the first answer that comes to your mind.

The Shyness scale:

		Very true	Mostly true	Neither true nor false	Mostly false	Very false
1.	I feel shy about meeting new people.	5	4	3	2	1
2.	If I am asked to deliver a message to an adult, I feel uncomfortable about going up to them.	5	4	3	2	1
3.	I can generally think of something to say, even with strangers (score reversed).	5	4	3	2	1
4.	It is a lot easier for me to talk to people I know than to strangers.	5	4	3	2	1
5.	I am not shy (score reversed).	5	4	3	2	1
6.	I feel shy with kids of the opposite sex.	5	4	3	2	1
7.	I like meeting new people (score reversed).	5	4	3	2	1
8.	I am shy.	5	4	3	2	1
9.	It is hard for me to talk to my friends parents.	5	4	3	2	1

The Fearfulness scale:

		Very true	Mostly true	Neither true nor false	Mostly false	Very false
1.	I am nervous of some of the kids at school who push people and throw your books around.	5	4	3	2	1
2.	I am often afraid of getting into trouble.	5	4	3	2	1
3.	I sometimes think about my parent(s) dying or leaving me and get frightened.	5	4	3	2	1
4.	I am afraid of being late to activities and appointments.	5	4	3	2	1
5.	I often do not say what I think in class or with friends in case people think I am stupid.	5	4	3	2	1
6.	The thought of death makes me frightened.	5	4	3	2	1
7.	I often feel scared when I enter a darkened room at home.	5	4	3	2	1

The Autonomic Reactivity scale:

		Very true	Mostly true	Neither true nor false	Mostly false	Very false
1.	When something unexpected startles me, my heart usually starts beating quite fast.	5	4	3	2	1
2.	My heart usually starts beating fast when I have to speak before the class.	5	4	3	2	1
3.	My hands get cold when I am nervous.	5	4	3	2	1
4.	My hands usually sweat when I have to talk in front of the class.	5	4	3	2	1
5.	I usually have to go to the bathroom more often than usual when I get excited about something.	5	4	3	2	1
6.	Sometimes my legs shake under the table when I am nervous.	5	4	3	2	1
7.	When I have to speak in front of a group, my voice sounds funny.	5	4	3	2	1

The Imaginary Audience Scale

Please listen carefully to the following stories as they are read out to you, and imagine that the events actually happened to you. Place a check next to the answer that best describe what you would do or feel in that situation.

1. You have been looking forward to the most exciting dress up party of the year. You arrive after hour's drive from home. Just as the party is beginning you notice a grease spot on your trousers or skirt. (There is no way to borrow clothes from anyone.) Would you stay or go home?

____ Go home
____ Stay, even though I'd feel uncomfortable
____ Stay, because the grease spot wouldn't bother me.

2. Let's say some adult visitors came to your school and you were asked to tell them a little bit about yourself.

____ I would like that.
____ I would not like that.
____ I wouldn't care

3. It is Friday afternoon and you have just had your hair cut. The barber or hairdresser did a terrible job and your hair looks awful. To make it worse, that night is the most important sporting event of the season and you really want to see it, but there is no way you can keep your head covered without people asking questions. Would you stay home or go to the game?

____ Go to the game and not worry about my hair.
____ Go to the game and sit where people won't notice me very much.
____ Stay home.

4. If you went to a party where you did not know most of the kids, would you wonder what they were thinking about you?

____ I wouldn't think about it.
____ I would wonder about that a lot.
____ I would wonder about that a little.

5. You are sitting in class and have discovered that your jeans have a small but noticeable split along the side seam. Your teacher has offered extra credit towards his/her course grade to anyone who can write the correct answer to a question on the blackboard. Would you get up in front of the class and go to the blackboard, or would you remain seated?

____ Go to the blackboard as though nothing had happened.
____ Go to the blackboard and try to hide the split.
____ Remain seated.

6. When someone watches me work...
____ I get very nervous.
____ I don't mind at all.
____ I get a little nervous.

7. Your class is supposed to have their picture taken, but you fell the day before and scraped your face. You would like to be in the picture but your cheek is read and swollen. Would you have your picture taken anyway or stay out of the picture?
____ Get my picture taken even though I'd be embarrassed.
____ Stay out of the picture.
____ Get my picture taken and not worry about it.

8. One young person said, "When I am with people I get nervous because I worry about how much they like me."
____ I feel like this often
____ I never feel like this.
____ I feel like this sometimes.

9. You have been looking forward to your friend's party for weeks, but just before you leave for the party your mother tells you that she accidentally washed all your good clothes with a red shirt. Now all your jeans are pink in spots. The only thing left to wear are your jeans that are too big and too baggy. Would you go to the party or stay home?
____ Go to the party, but buy a new pair of jeans to wear.
____ Stay home.
____ Go to the party in either pink or baggy jeans.

10. Suppose you went to a party that you thought was a costume party, but when you got there you were the only person wearing a costume. You'd like to stay and have fun with your friends, but your costume is very noticeable. Would you stay or go home?
____ Go home.
____ Stay and have fun joking about my costume.
____ Stay, but try to borrow some clothes to wear.

11. Let's say you wrote a story for an assignment your teacher gave you, and she asked you to read it aloud to the rest of the class.
____ I would not like that at all.
____ I would like that, but I would be nervous.
____ I would like that.

12. If you were asked to get up in front of the class and talk a little bit about your hobby...
____ I wouldn't be nervous at all.
____ I would be a little bit nervous.
____ I would be very nervous.

Appendix D: *Further detail on results*

Distribution of weight concerns

Girls:	Age			
	11	**12**	**13**	**Total**
1. How much more or less do you worry about your weight and body shape than other girls your age?				
I worry a lot less than other girls	20.5%	15.4%	3.6%	14.2%
I worry a little less than other girls	25.6%	12.8%	21.4%	19.8%
I worry about the same as other girls	28.2%	51.3%	32.1%	37.7%
I worry a little more than other girls	17.9%	10.3%	21.4%	16%
I worry a lot more than other girls	7.7%	10.3%	21.4%	12.3%
2. How afraid are you of gaining 1 kg?				
Not afraid of gaining	43.6%	20.5%	10.7%	26%
Slightly afraid of gaining	28.2%	35.9%	35.7%	33%
Moderately afraid of gaining	15.4%	17.9%	28.6%	19.8%
Very afraid of gaining	12.8%	12.8%	7.1%	11.3%
Terrified of gaining	0	12.8%	17.9%	9.4%
3. When was the last time you went on a diet?				
I have never been on a diet	79.5%	74.4%	85.7%	79.2%
I was on a diet a year ago	5.1%	2.6%	0	2.8%
I was on a diet about 6 months ago	2.6%	2.6%	0	1.9%
I was on a diet three months ago	2.6%	5.1%	7.1%	4.7%
I was on a diet about 1 month ago	5.1%	7.7%	0	4.7%
I am now on a diet	5.1%	7.7%	7.1%	6.6%
4. Compared to other things in your life, how important is your weight to you?				
Not important compared to other things	71.8%	53.8%	35.7%	55.7%
A little more important than some other things	25.6%	28.2%	46.4%	32.1%
More important than most, but not all things	2.6%	12.8%	7.1%	7.5%
The most important thing in my life	0	5.1%	10.7%	4.7%
5. Do you ever feel fat?				
Never	28.2%	12.8%	21.4%	20.8%
Rarely	35.9%	12.8%	25%	24.5%
Sometimes	23.1%	38.5%	14.3%	26.4%
Often	7.7%	20.5%	14.3%	14.2%
Always	5.1%	15.4%	25%	14.2%

Boys

	Age			
	11	**12**	**13**	**Total**
How much more or less do you worry about your weight and body shape than other boys your age?				
I worry a lot less than other boys	26.9%	40%	46.7%	36.6%
I worry a little less than other boys	11.5%	3.3%	20%	9.9%
I worry about the same as other boys	53.8%	40%	13.3%	39.4%
I worry a little more than other boys	3.8%	16.7%	13.3%	11.3%
I worry a lot more than other boys	3.8%	0	6.7%	2.8%
How afraid are you of gaining 1 kg?				
Not afraid of gaining	65.4%	66.7%	66.7%	66.2%
Slightly afraid of gaining	26.9%	13.3%	6.7%	16.9%
Moderately afraid of gaining	3.8%	13.3%	6.7%	8.5%
Very afraid of gaining	0	3.3%	0	1.4%
Terrified of gaining	3.8%	3.3%	20%	7.0%
When was the last time you went on a diet?				
I have never been on a diet	96.2%	93.3%	93%	94.4%
I was on a diet a year ago	0	0	0	0
I was on a diet about 6 months ago	0	0	0	0
I was on a diet three months ago	0	0	0	0
I was on a diet about 1 month ago	0	3.3%	0	2.8%
I am now on a diet	3.8%	3.3%	6.7%	2.8%
Compared to other things in your life, how important is your weight to you?				
Not important compared to other things	73.1%	66.7%	86.7%	73.2%
A little more important than some other things	15.4%	26.7%	13.3%	19.7%
More important than most, but not all things	3.8%	6.7%	0	4.2%
The most important thing in my life	7.7%	0	0	2.8%
Do you ever feel fat?				
Never	42.3%	66.7%	73.3%	59.2%
Rarely	34.6%	16.7%	13.1%	22.5%
Sometimes	15.4%	13.3%	0	11.3%
Often	3.8%	3.3%	13.1%	5.6%
Always	3.8%	0%	0	1.4%

Post-hoc regression analysis including a separate variable consisting of two items from the IAS related to fear of negative evaluation.

The regression analysis was performed for girls only. Age, shyness, IAS, fearfulness, autonomic reactivity, and items 4 + 8 from the IAS scale were entered into the regression analysis.

$R = .466$

$R^2 = .22$

$F\ (6, 99) = 4.57, p < .000$

The two items from the IAS and age were the only variables that significantly predicted weight concerns. More details about the relationship are presented in the table below:

	B	Std. error	Beta	Part correlation	t	Sign. of t
IAS item 4+8	8.62	2.34	.41	.33	3.68	.000
age	6.22	2.42	.25	.23	2.57	.012